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Blood Tests in Paternity Litigation

Assembly Committee on Judiciary

ASSEMBLY COMMITTEE ON JUDICIARY

BLOOD TESTS IN PATERNITY LITIGATION

Hearing of September 22, 1980
California Museum of Science & Industry
Space Building – Muses Room
700 State Drive, Exposition Park
Los Angeles, California

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CHAIRMAN JACK R. FENTON: We're ready to commence. Let me introduce the people at the desk. We have Consultant Lettie Young; Assemblyman Richard Hayden from Santa Clara County; Chief Counsel Rubin Lopez; Rica Cohen, Committee Secretary; and Assemblywoman Jean Moorhead from Sacramento.

The subject of today's hearing is the admissability of blood test evidence in disputed paternity cases. We'll be considering whether the law should be changed in view of the various blood testing systems that are available. Much of this hearing will consist of medical testimony to give us a comprehensive look at blood testing systems. We'll examine whether blood test evidence should be used as affirmative proof of paternity. We will also discuss the legal and social impact of using such evidence to show the probability that a paternity defendant is the natural father. At the outset, I wish to make clear to everyone that all references to Assemblyman Stirling's AB 1981 should be confined to the bill as it was introduced, not as it was amended and sent to the Governor. All remarks on blood tests should refer to Evidence Code Section 895. Our first witness is the author of AB 1981, Assemblyman Dave Stirling of Whittier.

ASSEMBLYMAN DAVE STIRLING: Thank you, Mr. Chairman. I would like to thank the members of the Committee who have taken the time to come to this hearing, and I would also like to thank the consultant who did an outstanding job in preparing for this hearing.

Mr. Chairman and members, the purpose of this hearing is educational. I would like to remind the witnesses, as well as thank them certainly for their participation, that the purpose of this hearing, even though there are only a few members of the Judiciary Committee present, is really to prepare a record. This is a fairly complicated subject -- at least it will seem that way, I'm sure. It's a new idea. It's not one that I felt that we could simply go before the Committee and immediately change minds and educate in the confines of an ordinary hearing before the Judiciary Committee, and so I requested, and the Chairman was gracious enough to grant, this interim hearing.

CHAIRMAN FENTON: Let me say that I was remiss in not saying that you too are a member of this Judiciary Committee. I forgot, David, sorry.

ASSEMBLYMAN STIRLING: Thank you. Mr. Chairman and members, for some years now, for practically forever in the history of paternity cases, the classic procedure has simply been that the mother of the child would indicate in testimony that she did have relations with Mr. "So and So." She would also hold up for the jury the child and say, "Doesn't he look like the alleged father, Mr. 'X'?" Pretty much that has been the procedure for demonstrating a prima facie case in a paternity situation. However, in the last couple of decades medical science

has developed various types of blood testing which would make it possible to demonstrate to a jury or to the court greater scientific accuracy in making some determination as to who is in fact the father.

The purpose of this bill, and I would like this to be very clear -- this is not a man's issue, or a woman's issue. This is an issue of truth. We're trying to find out who is the father of the child. The child certainly has a right to know that. I think society has a right to know that because the possibility of improving the ability of producing evidence in a paternity case has many ramifications, not the least of which is the reduction in the number of trials perhaps that this kind of evidence could assist in. It would also help, I believe, in the reduction perhaps of those who find it necessary to go to the AFDC program because if we knew who the father was it would perhaps be a responsibility better borne by that individual. There are many experts today -- I don't want to take anymore time. I would like to introduce Robert W. Peterson, Doctor of Jurisprudence, Professor of Law at the University of Santa Clara, as the first witness.

PROFESSOR ROBERT W. PETERSON: Thank you very much. Mr. Chairman, Assemblyman Stirling, let me thank you for this opportunity to address this particular bill. I would like first briefly to tell you just how we got to where we are legally with respect to blood test evidence. I think you know most of that already. I would like to talk about some doubts I have about the bill in its present form and make some suggestions as to how it might be amended so that juries will not be misled by this evidence.

The current law really had its genesis in the unfortunate case of Berry v. Chaplin [74 Cal. App. 2d 652 (1946)],where Charlie Chaplin found that he was the father of a child whose blood test showed that he could not have fathered. Following that case, in 1952 the Commissioners on Uniform Laws promulgated the Uniform Act on Blood Tests to Determine Paternity. California adopted that act in 1953, and it's found in Evidence Code Sections 890 to 897. The main provisions of that act are three. First, if a father is excluded as the father, then that is conclusive. If the experts disagree as to whether or not an exclusion has been achieved, then the evidence goes to the jury on all the evidence in the case. Lastly, the third provision in the Uniform Act is that if the tests show the possibility of paternity then the judge in his discretion could submit the blood test evidence "depending on the infrequency of the blood type." That third provision in the Uniform Act was not adopted by California, and this was commonly read over the years as evidencing legislative intent that blood group evidence should not be used to prove paternity. Witkin so stated in his book on evidence, and,as you know,if Witkin says it's California law it's like a command of the mikado; it has a way of being a self-fulfilling prophecy.

This conservative attitude carried on in other situations. For example, in the criminal area the California Supreme Court decided a very famous case called People v. Collins [68 Cal. 2d 319 (1968)], in which the district attorney attempted to statistically prove that because of the correlation between certain characteristics of the defendant and certain characteristics of the person who committed the crime the defendant had a probability of being innocent of one in twelve million. Well, the California Supreme Court reversed that case in part because there was no basis for assumptions

made for the calculation, in part because the district attorney calculated the wrong probability in the case, and in part because of a distrust of trial by mathematics, a fear that juries, judges and attorneys are not going to be able to respond to mathematical types of evidence. Later, by 1973, California also adopted the Uniform Parentage Act, which you find in Civil Code Section 7000. The Uniform Act again had a provision which specifically referred to probability calculations in paternity cases. Again, the Legislature did not adopt that portion of the act.

With this legislative background, the California court of appeal in the case of Dodd v. Henkel [83 Cal. App. 3d 604] in 1978 decided that the blood group evidence was not admissible to prove paternity. When though an HLA case was presented, the court of appeal came up with an astonishing conclusion, to my mind, that the HLA is not a blood test, that HLA is a tissue test, and ruled in Cramer v. Morrison [88 Cal. App. 3d 873 (1979)] that HLA tests are admissible. This is even more astonishing because the HLA test relies on exactly the same genetic principles and exactly the same mathematical calculations. I think what pushed the court to conclude that the HLA test should be admissible is the fact that the HLA test tends to produce very high probabilities of paternity, much higher than the normal number of red cell blood tests that are run. Well, that's just because not very many red blood cell tests are run. In Sweden, where they normally run about twelve, and they have been doing paternity testing in this way for well over twenty years, in over 50 percent of the cases they achieve a 95 percent probability using red blood cell tests alone. It's really just a matter of how many systems you test, not some great difference between HLA and red cell tests that makes HLA more popular.

CHAIRMAN FENTON: You say that in Sweden they do this and they get a 50 percent probability, if I heard you correctly. If I didn't, you tell me. Is that correct so far?

PROFESSOR PETERSON: No, my basis for that statement is a random sample of five hundred non-excluded men. In that random sample over 50 percent of those, over two hundred and fifty of them, scored a 95 percent probability of paternity using red blood cells alone.

CHAIRMAN FENTON: So, it's even money, one on one almost, that you'll be 95 percent. What's the other percentage? What's the other 50 percent, approximately? Where does that go?

PROFESSOR PETERSON: The other 50 percent tends to clump very high -- up around the 90 percent bracket. It's a funny curve. You don't get a median at 50 percent. It's a very low curve, and as you approach 80 to 90 percent, it sweeps up. A lot of people are scoring around 80 and 90 percent, and over half of those people are over 95 percent.

CHAIRMAN FENTON: How many are under 95 percent? I don't quite understand what you're telling me. You say that a curve starts at a certain point. Now I don't know if out of a thousand people this 80 or 90 percent starts with five hundred and you had the five hundred from 80 up. If they are, then what's the five hundred below? Do you understand my question?

PROFESSOR PETERSON: Yes, I have the figures for tests that have been done in UCLA Lab using HLA.

CHAIRMAN FENTON: If I'm a little premature in what you're doing, then just go on with your thesis.

PROFESSOR PETERSON: And there 13 percent are below 90 percent -- about 13 percent -- and all the rest are above 90 with 67 percent scoring over 95 percent and 41 percent scoring over 98 percent. It's the curve that starts in the 80 and 90 percent region and then jumps up very sharply. So most of your people are down at the far end of the curve. Very few people score 1 percent, 2 percent, 20 percent, 30 percent. They're almost non-existent.

CHAIRMAN FENTON: Thirteen percent is not non-existent.

PROFESSOR PETERSON: That's 13 percent below 90 percent. You see what I mean.

CHAIRMAN FENTON: Mr. Hayden.

ASSEMBLYMAN RICHARD HAYDEN: Mr. Chairman, I think I'm having the same problem perhaps that you are. I understand the curve now, but I don't understand the significance of that. What does it really mean? You have only 13 percent below the 90 percent level. How do you interpret that? Is that what you were going to...

PROFESSOR PETERSON: No, the only point I'm making is that you can use red cell tests and white cell HLA tests and get comparable results. You can get very high percentages in a very high number of cases. You can get a lot of people scoring over 95 percent. With respect to the HLA test, you can do one test and you will probably get a very high score. With the red cell test, you have to test a lot of systems, but if you do test a lot of systems you'll get a comparably high score of 95 percent or above. That's the point I'm trying to make. There really is not a difference between HLA and red cell tests. They should probably be treated in exactly the same way, based on the same genetic principles and the same mathematical calculations.

CHAIRMAN FENTON: Mrs. Moorhead.

ASSEMBLYWOMAN JEAN MOORHEAD: You selected a nation to give us that comparison because they do more?

PROFESSOR PETERSON: That's right. Sweden has been doing these tests for decades now. They have relied primarily on red cell tests although they can do HLA too, and the red cell tests are perfectly adequate for paternity purposes.

CHAIRMAN FENTON: When you say "perfectly adequate," that's your opinion. As a law professor you amaze me, you know, because you say, "perfectly adequate" and you forget what you tell your students, "in my opinion."

PROFESSOR PETERSON: In my opinion, they're perfectly adequate.

CHAIRMAN FENTON: I'm sure there are some authorities that disagree with you.

PROFESSOR PETERSON: Well, we'll see what happens. (Laughter) We have some eminent authorities here.

CHAIRMAN FENTON: Mr. Hayden.

ASSEMBLYMAN HAYDEN: Professor, you simply, I guess, are attempting to show the reliability or relative reliability of both tests. Is that correct?

PROFESSOR PETERSON: Yes. My point is that the distinction made in Dodd v. Henkel and Cramer v. Morrison is not a valid distinction, that both red cell tests and white cell tests are as reliable and calculations are as reliable, and it's not a distinction that we should preserve. They should both be treated the same way -- they should either be admissible or they should be excluded. As the law stands right now, the distinction between the red cell and the white cell test is not one that should really exist.

ASSEMBLYMAN HAYDEN: Could I ask Mr. Stirling to refresh my mind on what his bill did with respect to this particular point? What was the bill in its original form, Dave?

ASSEMBLYMAN STIRLING: The bill deals with blood testing -- the subject of this hearing. That has not changed. The bill was subsequently amended to something else. That bill is on the Governor's desk; he should not have any concern about that. It's totally different than what this bill originally began as. The way the bill originally was presented is what we're holding this hearing on. We simply would have allowed the court or the jury to hear evidence in the form of red blood cell, the white blood cell, the antigens, HLA testing, various forms of blood testing to demonstrate paternity. I would not distinguish between the various tests. It's the court that has made a rather difficult and inaccurate choice in calling HLA a tissue test and, therefore, it is not excluded by the statute -- the present law.

ASSEMBLYMAN HAYDEN: Well, should this be spelled out in future legislation?

ASSEMBLYMAN STIRLING: That is the point I think that Dr. Peterson is talking about, and I'm inclined to agree with that.

PROFESSOR PETERSON: My point is that the law right now is in an intolerable state because they've drawn a distinction which makes no sense. HLA tests come in; red cell tests are out. They both should be treated the same way.

CHAIRMAN FENTON: What does it cost for white blood cell tests? I assume you take one or two, and yet you talk about doing ten or twelve. You talk about costs. The reason you normally want to do ten or twelve red is because it's cheaper to do ten red rather than whatever you do in white, I don't know.

ASSEMBLYMAN STIRLING: Mr. Chairman, we will have experts in those particular cases.

CHAIRMAN FENTON: We will? Well, okay. Thank you.

PROFESSOR PETERSON: My concern in allowing blood evidence in is that studies, lie detector studies, have shown that you have as much perjury at paternity trials as you have a liar's convention on both sides. It's very hard to decide who's telling the truth.

CHAIRMAN FENTON: Can I ask you a question?

PROFESSOR PETERSON: Sure.

CHAIRMAN FENTON: Lie detector tests determine, so I assume that...

PROFESSOR PETERSON: In my opinion. (Laughter)

CHAIRMAN FENTON: I assume that you assume that lie detector tests are valid. Therefore, why don't we just work on the lie detector tests and worry less about admitting blood or not? You seem to indicate that you have unfounded faith in lie detector tests.

ASSEMBLYMAN STIRLING: I have another bill on that subject, Mr. Chairman. (Laughter)

PROFESSOR PETERSON: That's right; I had to do a brief on that. I can simply say that one study showed from the lie detector tests, however reliable they are, that there is perjury in 82 percent of the cases on one side or the other. These are hard cases for a jury to decide based on the kind of impressionistic evidence that you usually get. There is a natural tendency if something looks like a paternal fingerprint to leap on that and say, "This is the cheap and easy way out of resolving this controversy, and these look an awful lot like paternity fingerprints." A lot of people have jumped to the conclusion that they do in fact prove paternity.

CHAIRMAN FENTON: Can I ask you another question about fingerprints? As I understand it, and I'm not an expert, that except in the case of the son of my constituent where they took his print from somewhere else and put it there, no two fingerprints are alike.

PROFESSOR PETERSON: That's been the experience.

CHAIRMAN FENTON: So it's supposed to be 100 percent infallible assuming that we found it at the proper place, but we don't have that in blood tests as of yet. We don't have 100 percent infallibility. If we did, I don't think we would have any problem. When you keep talking about the fingerprint of paternity, I don't think we can make a comparison. All of us, I'm sure, want the father to take care of his child. Whether the child is legitimate or illegitimate is unimportant. I don't want to support someone else's children unless they can't do it. My theory is every father, and I'm chauvinist in that respect, should take care of his children, legitimate or illegitimate. My question is just how reliable is this if under your tests we're going to nail ten fathers and one to two of them aren't the natural father. I get a little concerned that we're getting one or two men that we shouldn't. You understand what I'm saying?

PROFESSOR PETERSON: That's exactly my point because these look like paternity fingerprints, but they aren't. They're not close to that, but people assume that they are. In this one article written about the paternity test, the author says that these blood tests now make it possible to prove paternity in over 90 percent of the cases, and, going on, he says that the probability of the man's paternity can be computed. Those statements are simply inaccurate. That's the way that blood tests are perceived, but that's not what is being proven. I have done a chart here so that I can try to explain.

CHAIRMAN FENTON: When you refer to his statement about 90 percent, are those 90 percent all certain ones?

PROFESSOR PETERSON: The author is referring to the fact that over 90 percent of the non-excluded men score over 90 percent on the test, and he thinks that if you score over 90 percent the probability comes in that you are 95 percent likely to be the father, that proves that you are the father. It doesn't. This is what I want to show with the assistance of this chart because you have to understand just a little bit about genetics. I think we all understand that the mother has to pass one of the pair of genes to the child, and the father has to pass another of a pair of genes to the child in case one and case two. The alleged father in case one has two red genes. He has to pass one red gene to the child. In case two, he has one red gene so he has a 50 percent possibility of passing the red gene to the child. The mother in both cases has no red genes so if this child has a red gene it had to come from the father. There is no other way for it to get there, barring mutation. So, the calculation runs something like this. What is the probability that this man if he were the father would pass a red gene? In the first case it's 100 percent, he has to pass a red gene. In the second case, it's 50 percent; he has a 50 percent probability of passing a red gene. What is the possibility that a randomly selected man, whom we will refer to as Mr. "X," the other man that the defendant is saying is the father of this child, would have passed that red gene? In my hypothetical case, the red gene's frequency in the population is 10 percent. So, you get a frequency of 10 percent in both cases. The probability that a random man would pass a red gene is 10 percent.

CHAIRMAN FENTON: Well, let me ask you this -- I don't know much about mathematics, but if 10 percent of the population has two, 10 percent has one, then it's 20 percent altogether when we're talking about the red genes.

PROFESSOR PETERSON: I'm just talking about the frequency that you find that gene in the population.

CHAIRMAN FENTON: If I'm the individual you're trying to accuse because of a red gene, 10 percent of the male population has two red ones and 10 percent has one red one, then we're talking about 20 percent. No?

PROFESSOR PETERSON: No, no. If you look at all the genes in the population, you will find the red gene will occur in 10 percent of the cases. As a matter of fact, you will find one man in a hundred who has two red genes. See, if the gene appears in 10 percent times population the liklihood any person will have two is 10 percent times

10 percent, or one in one hundred. That's illustrated in my chart below where I take one hundred random men. Let me go on with this calculation. This is what the paternity labs do now. They compare the probability to Mr. "X," the random man. In case number one, the defendant is ten times more likely to pass that gene than the random man because his probability of passing it is one; the probability of a random man passing it is ten percent; so the ratio is 10 to 1. In case number two, the same calculation would come out 80 percent. Some labs stop there. That's what you get from the lab -- he is ten times more likely than a random man to be the father. Other labs will take the next step and convert that into a percentage. A random man has a probability of one in ten of being the father. Therefore, our defendant has nine chances out of ten of being the father and that converts to 90 percent. The UCLA Lab gives you a percentage, and it will say that you have a 90 percent probability of being the father as compared to a random man. In case number two, it's 80 percent. Well, that looks pretty good. It looks like we have the man.

CHAIRMAN FENTON: Eighty percent -- I thought it was 50 percent.

PROFESSOR PETERSON: No, in case number two, look at the very last box.

CHAIRMAN FENTON: Oh, way over there, I see.

PROFESSOR PETERSON: Eighty percent -- the difference being the first man is homozygous in his two red genes and the second man has only one. Well, what does that mean? Does that mean that the chances are 80 percent we have the father? Well, the answer to that is no. What I have done at the bottom, I have taken one hundred randomly selected men, and each one has two genes. I have clipped the distribution of genes in the way that I think you would find it in one hundred random people. They would be scrambled around. The chances are that you would have on the average one man who would have two red genes, and then you would have eighteen men who would have one red gene. You wouldn't find any red genes in all the rest because this gene is found in only 10 percent of the population. That means that in this small town where there are only one hundred men who could be the father there are nineteen candidates. This is a small town. This is not Los Angeles, where you are going to get thousands and thousands of candidates. Everyone of those men in this small town would score 80 percent except the first one, he would score 90 because he's a homozygous and he has two red genes. There, I think, is where the misunderstanding comes in as to what these tests really mean and what they don't mean.

CHAIRMAN FENTON: That's assuming there weren't any traveling people.

PROFESSOR PETERSON: That's right. This is a small town. Now let me give you another example. Take it out of the context of genes. Let's look at a license plate. Let's put it in a context that would be easier to follow. Let's assume that we have license plates like most of California's license plates, three numbers followed by three letters. Let's assume that a hit and run automobile has hit a cow and killed it. Embossed on the cow like a brand is the first

number of a California license plate. Let's assume it's a "1." We go out and we grab a car that starts with "1." We do the calculation they do in the paternity lab. What is the liklihood that this is the car as opposed to a random car? It's ten times more likely to be the car than a random car because other cars can start from 0 to 9 in the first digit. So this car scores 90 percent. So doing their calculation, this automobile is more likely to be the car than a randomly selected car. The score is 90 percent. That's pretty good. So now our veterinarian shaves the hide and,by golly,you can make out the next number on that license plate. It's a "0." We released the car that was just seized because it started with "1, 5"; it's got an exclusion. It's like a paternity exclusion. Then we go out and we grab a car that's got a "10." What can we say? That car is one hundred times more likely to be the car than a randomly selected car. It will score 99 percent doing the paternity calculation. Take it one step further. We put a dye on the carcass and find the last number. The last one is also a zero. We release the car we just seized because this has a "1, 0, 5"; it gets an exclusion. What can we say about this car? It is a thousand times more likely to be the car than a randomly selected car. It will score 99.9 percent on our license plate test, but do we have the right car? Obviously, we can have twenty-six letters in any of these other spots and if you multiply that out you'll get over seventeen thousand possible combinations of automobiles that will start with "100," which means that the chances you got the right car are really one in over seventeen thousand. That comes out .006 percent,and the difficulty with applying this to blood tests is that blood tests are less reliable because there's no issuing agency that gives out only one license.

There are lots of people who will have the same blood type. So the calculation is misleading unless you take it a few steps further. We'll give you another example. I have it up here. Let's take "A" who has a probability of being the father of one in ten thousand. Very, very low. "B" has a probability of being the father of one in ten million, even lower. "A" is a thousand times more likely to be the father than "B." "A" will score 99.9 percent on the paternity tests that are being done. You see the difficulty with this. You can't jump to the conclusion that you really have decided who is or who is not the father. Well, the remedy to this, I think, is to include in this bill that you cannot use these blood tests as evidence of paternity until you find, based on other evidence in the case, that this man is at least as likely to be the father as a random individual. That means that from the other evidence in the case you're going to have to conclude that there was in fact intercourse, that it happened at the probable time of conception, and that,all things being equal, this man is as likely as Mr. "X" to be the father. If you make that assumption, then the blood group evidence really does mean that he is 99 percent likely to be the father.

CHAIRMAN FENTON: Why do you do Mr. "X" and not Mr. "A" through "Z," for instance, as likely?

PROFESSOR PETERSON: You can. You can assume as many people as you like as long as you come to the conclusion that the defendant is 50 percent likely as compared to those other men. I have a formula that I'm going to come to in a minute which will show you how to work in as many men as you want, but even in Sweden they seldom have more

than two man cases. They're pretty rare. I think that the people who are going to be testifying after me have much more expertise in this area and will back me up. That is the hidden assumption that is just not obvious to attorneys. It's not obvious to jurors. It's not obvious to judges, but it's absolutely critical to the proper use of this paternity evidence. That's why I think this bill should be amended to include a specific direction to the trier of fact that these statistics not be used until there is a preliminary finding or there is sufficient evidence from which to find that this man at least has a 50 percent probability of being the father. Then you're using the statistics correctly.

CHAIRMAN FENTON: Fifty percent from the viewpoint of numbers of who could be the father? You mean one out of two?

PROFESSOR PETERSON: No, just from probability, just from looking at all the evidence, frequency of cohesion, use or non-use of birth control, were they living together, or were they not living together. From all that circumstantial evidence...

CHAIRMAN FENTON: Well,don't you also put in the number of people that had access to her at the time?

PROFESSOR PETERSON: Sure, that's part...

CHAIRMAN FENTON: But then you could only have two. Otherwise if you find three, he's not going to have a 50 percent probability, right?

PROFESSOR PETERSON: No, he could still be 50 percent likely to be the father if say he was living with the woman and they were having intercourse frequently and there was only one other affair or only two other affairs. If you look at two times versus ten times, the one who has the ten is going to be much more likely to be the father than the two other people. That's the way you have to look at it. Not the number of other people, but its the probability that he is the father based on all of the evidence that is critical.

CHAIRMAN FENTON: So if you had ten people who had intercourse with her, within that time of conception, it would be unimportant since he was living with her and all these other factors you still get the 50 percent with him, is that what you're saying?

PROFESSOR PETERSON: No, the jury would have to get to the 50 percent with him before they could properly use this blood test evidence. And if they come to the conclusion that the chances that he's the father are only one in ten, then they are completely misusing the statistical evidence to conclude that since he scored 99 percent he is the father.

CHAIRMAN FENTON: Let's say four other men have been proven to have sex with her during the period of conception, except one man was living with her at the time. How do you arrive at 50 percent in a situation like that?

PROFESSOR PETERSON: I don't think you would.

CHAIRMAN FENTON: Well, that's what I'm saying. Actually then, the number of persons who had sex with that person during the period of conception does not determine the 50 percent. I'm really lost.

PROFESSOR PETERSON: No, that's simply one of the factors. You have to also consider what time of the month did they have intercourse because that's going to be relevant. If one person had intercourse during a period of high fertility and ten people had intercourse during a period of practically no fertility, that's an important factor that has to be included in your equation also.

CHAIRMAN FENTON: Right.

PROFESSOR PETERSON: So you can't just look at the numbers of people; you have to look at all the...

CHAIRMAN FENTON: But then the triers of fact are going to have to be given all these particular facts, and then they're going to have to weigh them, right?

PROFESSOR PETERSON: That's right, yes.

CHAIRMAN FENTON: Mrs. Moorhead wants to ask you something.

ASSEMBLYWOMAN MOORHEAD: I'm confused as to why you want all the other facts brought out first. It sounds to me like you're saying you want to hold the blood test as something that you would not just put in with all the other facts, that you would hold that until you have all those others.

PROFESSOR PETERSON: Well, I think the reason for that is firstly the blood tests are terribly persuasive in a way that they shouldn't be. You look at that 98 percent, and it's very hard to put that out of your mind. You say, "Wait a minute. That means nothing until I first conclude from the circumstantial evidence that we have a 50 percent probability." That's hard to do. Secondly, it's just an orderly way to go about trying the case. Typically, if the particular piece of evidence is not relevant unless there is first a preliminary finding with respect to some other fact, you might hold that piece of evidence until...

CHAIRMAN FENTON: You mean you would send a jury out to find a preliminary finding and then they come back?

PROFESSOR PETERSON: No, no, I would not. I would not send the jury out. That would be much too cumbersome.

CHAIRMAN FENTON: How do they make their preliminary finding then?

PROFESSOR PETERSON: The judge would have to do it. The judge would have to say...

CHAIRMAN FENTON: He becomes the trier of fact then.

PROFESSOR PETERSON: No, no, he doesn't try the facts. He

simply decides if there is sufficient evidence from which the jury could find that we do have a 50 percent probability in this case. Then he would let this evidence in. At the close of the case, he would then instruct the jury that this probability evidence which had been received should not be used as evidence to show intercourse and it should not be used as evidence to show that this person is the father until you first decide, based on all this other evidence, the circumstantial evidence, that he has a 50 percent probability of being the father.

CHAIRMAN FENTON: That the judge does.

PROFESSOR PETERSON: The judge instructs the jury that way.

CHAIRMAN FENTON: Well, he instructs and says, "I find it by law, and that's all, because the jury is the trier of fact now, that this defendant has a 50 percent probability of being the father." Is that what you're saying?

PROFESSOR PETERSON: No, no. He is simply directing the deliberation by saying "You first must decide, disregarding the blood type evidence, that this man has a 50 percent probability of being the father. And if you decide that, then look at this evidence and this evidence is now relevant and it's perfectly appropriate for this evidence to carry the day." That's the logical way to do it.

CHAIRMAN FENTON: It's a hell of a job you're giving the jury, I'll tell you.

PROFESSOR PETERSON: I know; it's tough.

ASSEMBLYWOMAN MOORHEAD: I don't think that's terribly logical. I come out of the health profession where you look at all your tests and what-not at one time before you're moving ahead with the diagnosis. It seems to me that in this situation you're withholding something because you think it's unduly complicated and the jury's not going to understand it. I don't understand why you don't present all the facts, I mean, why it all isn't presented at one time.

CHAIRMAN FENTON: Well, he says you do, but he says preliminarily you bring in the facts. When the judge charges the jury, he says, "Now from these facts which are listed initially, you are to make a determination as to whether the defendant has the probability of 50 percent of being the father. If you find him not to be, you're to find him not guilty. If you find him so, then you have to take in these other factors to make the determination whether he is in fact not guilty."

PROFESSOR PETERSON: That's right, and it's all before the jury at the end of the case. The jury is simply being told that these statistics don't mean what they appear to mean. You first have to make a 50 percent finding before 98.96 percent makes sense.

CHAIRMAN FENTON: I'm sure we'll develop it with your other witnesses too, David.

ASSEMBLYMAN STIRLING: I would suspect that the way it would be done procedurally is that at some point counsel for the alleged

father could make a motion not to allow the blood test evidence to come in, and at that point the judge would make the determination of whether it does come in or whether it doesn't. If the judge allows it to come in, then he or she has concluded...

CHAIRMAN FENTON (referring to Professor Peterson): And he says, "No"...

ASSEMBLYMAN STIRLING: No, it would not be a motion necessarily in front of a jury, but in order to allow the blood test evidence to come in before the jury, he would have to come to the conclusion that there was at least a 50 percent probability.

CHAIRMAN FENTON: Then the jury doesn't make that determination. He said, "Yes"; you say, "No."

ASSEMBLYMAN STIRLING: That is consistent with what he's saying.

PROFESSOR PETERSON: Well, I think you're both consistent, but I'm interpreting it the way you're interpreting it, that the preliminary finding before the judge is: "Is there sufficient evidence from which the jury could find that there is a 50 percent probability in this case?"

CHAIRMAN FENTON: You would make that motion and if he found not, he'd throw it out. If he found yes, the jury would still be charged to go in and make that determination anyhow. I got you.

PROFESSOR PETERSON: That's right. Then the blood test evidence comes in, and it all goes to the jury with this instruction that I'm proposing that they do not jump to the conclusion that we have a 98 percent probability unless they first find the 50 percent probability. That's absolutely critical, mathematically, to this making sense.

CHAIRMAN FENTON: Right.

PROFESSOR PETERSON: Now there's just one other point that I wanted to make. I did some research on this in Sweden where they've done this for years and have a lot of experience using it forensically. They use a formula like the formula written in brown at the bottom of this page. They calculate what they call the "paternity index" for the father, which basically compares him with the random man, like we've been doing. Let's assume he scores "19," nineteen times more likely. You put that in the numerator of this fraction. In the denominator you put the paternity index of all potential fathers. Let's assume we have a "one other man" case and he's a random man. The paternity index of a random man is "1." One random man is no more likely to be the father than any other. So the denominator becomes "19 + 1," or "20." You divide that out; you get 95 percent. The wonderful thing about this formula is that it gives the jury a very easy way of taking into consideration the circumstantial evidence. Suppose, for example, the jury decides that "X," the unknown man, is five times more likely to have been the father, based on the circumstantial evidence, than the defendant. You simply multiply "X's" index by "5" everywhere you find it in the formula, and you get "19" over "19 + 5" and that divides

out to 79 percent. Let's turn it around. Let's suppose the jury decides that the defendant is five times more likely to be the father than "X"; you multiply the defendant's index by "5," you get "95" over "95 + 1" and that comes out to be 98.96 percent. If you have three other men,three "X's," you simply put three "1's" in the bottom and multiply it out and that gives you exactly what the probability is. This way the jury can meld the probability evidence with the circumstantial evidence.

CHAIRMAN FENTON: Getting to your last statement that you made, if you were one of four, it wouldn't be 25 percent of that. It would be somewhere in the 90's, because you only put the "1 to 3" in that formula.

PROFESSOR PETERSON: That's exactly right because these are all random men. The other thing you can do is if you know who "X" is and you can test the blood of "X," "X" scores now a "paternity index" too. We put that index in, and we get a direct comparison between the two known men. He's no longer a random man. Then you can divide it out and see which of these two people is more likely to be the father. It's very, very easy to use. I think that you'd be well advised to use it. There's one other small point. In Sweden, they consider nothing significant if they don't get 95 percent or above. I'm really not well enough versed in statistics to understand the significance of that 95 percent figure, but I would think that since they've used 95 percent for years, that it would be a good idea if we used it. It wouldn't change cases much because so many people do score over 95 percent.

CHAIRMAN FENTON: Thank you very much. Very enlightening.

PROFESSOR PETERSON: I would like to submit, if I could,just a few letters, a letter that I wrote to Assemblyman Stirling, and a letter from Jack Valentin, who's been the head of paternity testing in Sweden for a number of years.

CHAIRMAN FENTON: Just give them to the sergeant, and we'll put them in the record.[1]

PROFESSOR PETERSON: Thank you.

CHAIRMAN FENTON: The next witness is Dr. Jeffrey Morris. David, do you want to introduce him?

ASSEMBLYMAN STIRLING: Dr. Morris is from the Memorial Hospital Medical Center at Long Beach, M.D. and a Ph.D. and has specialized in this particular area. He was the gentleman that I probably first spoke to and from whom I learned anything at all on this subject, and I think his presentation is very interesting.

DR. JEFFREY W. MORRIS: Mr. Chairman, ladies,and gentlemen, Assemblyman Stirling has asked me to address myself to four points. First of all, I'd like to give you a basic course in genetics so that you'll be able to understand the remainder of my testimony as well as

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1 Appendix A

the testimony of subsequent witnesses. Second, I would like to describe one of the three methods of paternity testing, and that is red cell antigens. Other witnesses will describe the other two major methods of paternity testing. Third, I'd like to show you how this information is used in court, including the likelihood of paternity calculation. I've brought material that will be presented in court in a trial in Orange County at the beginning of this week. Finally, I'd like to offer some recommendations as to the proposed legislation before you.

Could you hold up this first chart?

All inherited traits, including eye color or blood type, are inherited by genes. For all of the traits that we're going to be talking about here, genes occur in pairs. For each pair of genes, one is inherited from our mother, and the other from our father. Now, we can't see genes. Genes are located on structures called chromosomes. Each of us has in the nucleus of all of our cells forty-six chromosomes. These can be arranged by specific staining and size characteristics into twenty-three pairs of chromosomes. Just as genes occur in pairs, chromosomes appear in pairs. For each pair of chromosomes, we inherit one from our father and one from our mother. Genes determine traits. What we measure in the laboratory, that is the blood types, we refer to as "phenotypes." The underlying genetic makeup of that individual which led to that particular type is called the "genotype." So, genes determine traits. The trait we determine in the laboratory, the blood type, is called a "phenotype." The underlying genetic make-up of the individual is called the "genotype."

There are an estimated fifty thousand pairs of genes in the human genetic material, and this explains why, with the exception of identical twins, as far as we know, all human beings, are quite unique. A particular gene which is a determinant of a particular trait occurs at a particular location on a particular pair of chromosomes. This location is called the "locus." If there is variability at that locus, then we speak of "alleles." Alleles are the different choices for the genes at a particular locus for a particular trait -- gene variants.

I'm going to define two other words that you're going to hear a lot today, one of which is "antigen," and the second is "antibody." Antigen is a substance that is perceived as foreign by an individual who does not possess that antigen, and he responds with an immunological response, which includes in part the production of antibodies. Antibodies are specific substances that react with the antigen that's perceived as foreign. And the importance for paternity testing is that antibodies can be used as specific reagents to identify antigens.

Can I have the next chart, please?

Now, of the fifty thousand pairs of genes that make each of us unique, there are only a few dozen that have been shown to be useful in paternity testing, and we tested seventeen different systems, for all blood types. The three major criteria that a system must have for use in paternity testing is first, we must be able to determine reliably and reproducibly the type of the individual. Second, the inheritance pattern of that particular type must be very predictable so

that we can make strong inferences as to the genetic makeup of the individual from measuring the types. That is, we determine in a laboratory the phenotype, and we make inferences as to the genotype. And finally, there must be sufficient variability at that locus so there's a significant chance that two unrelated individuals will have the same type. If we look at a locus in which everybody had the same genetic makeup, we couldn't distinguish two individuals, and it wouldn't be very useful in paternity testing, despite fulfulling the requirements one and two. About fifty to sixty systems have been shown to be of value on paternity testing, and these fall into three major groups of tests.

Can we have the next chart?

The first group of tests are the red cell antigens. These blood types occur on the surface of red blood cells, and they are determined by specific antibodies which react with the red cells and cause them to clump or agglutinate. The fundamental medical or scientific application other than paternity testing for this particular system is in the transfusion of blood. The second major group of tests that are used in paternity testing are HLA, which are white cell antigens,and these occur analogous to red cell antigens on the surface of white blood cells. The major medical or scientific use for white cell antigens is in tissue transplantation, such as kidney transplantation. Finally there is a group of polymorphisms in the red cell enzymes in serum proteins. Their major scientific value other than paternity testing is in population studies.

Now I'd like to demonstrate to you how we go about paternity testing in the laboratory. I'm going to use as an example the GC system, which is a serum protein. This is a very simple system. It is useful to understand the basic principles. The GC system has two alleles. There's a gene "1" and there's a gene "2." The gene "1" holds for the protein "1" and the gene "2" holds for the protein "2." So there are three possible blood types that we can determine in the laboratory: type "1" protein, type "2" protein, or we can determine both. By inference, the underlying genotype, that is, the genetic makeup of that individual would be: a type "1" person would have two type "1" genes; a type "2" person would have two type "2" genes; and a person who types as "2-1" would have a type "1" gene and a type "2" gene.

May I have the next chart?

Let's take an example, a hypothetical example, of a child who types as type "1." By inference, he has two type "1" genes. The mother types as type "2-1," she has a "2" gene and a "1" gene. We know that the mother must have passed on the "1" gene to the child, and that indicates to us that the true father, whoever he is, must possess a type "1" gene. So already, we're getting...

CHAIRMAN FENTON: Could he also possess type "2"?

DR. MORRIS: Yes, he could be "1-2" or he could be "1-1," but he couldn't be "2-2."

CHAIRMAN FENTON: He had to have at least one type "1" gene.

DR. MORRIS: In the GC system for Hispanics, about 95.3 percent of the Hispanic population has at least one type "1" gene, and therefore would not be excluded in this system. 4.7 percent of the Hispanic population would be type "2-2" and would be excluded. The percentage of random men for a particular ethnic group who would be excluded by a particular system is called the "power of exclusion," and the power of exclusion depends upon the actual types of the mother and the child. In this particular example, the power of exclusion is 4.7 percent, which doesn't sound like much.

CHAIRMAN FENTON: While we're getting an easel for the charts, I'd like to introduce Assemblywoman Maxine Waters from Los Angeles County. Glad to have you here, Maxine. Go ahead, sir.

DR. MORRIS: Now this is material from the case going to trial this week, and the individuals here were tested in seventeen systems in the three major groups; in red cell antigens, in enzymes and proteins, and in HLA. The red cell antigens and enzyme and protein work was done in our laboratory. The HLA results were done at UCLA. The basic principle is to examine the blood types...

CHAIRMAN FENTON: Is this a civil or criminal case that you're referring to?

DR. MORRIS: Civil.

CHAIRMAN FENTON: Civil. Is this sort of testing permitted in criminal cases too?

DR. MORRIS: We have done work for criminal cases.

CHAIRMAN FENTON: Okay.

DR. MORRIS: Before I go through this data, let me make some points about the group of tests which are known as "red cell antigens." This is the best known and best studied of the three methods used in paternity testing. The first red cell antigen system was discovered in the year 1900 by Landsteiner and over the ensuing eighty years many tens of millions of individuals have been tested in this system. At the present time, there are more than a hundred red cell antigen systems known, of which about ten have been shown to be of value in paternity testing by the above criteria. These systems offer substantial advantages in paternity testing. First, they've been extensively studied, and the genetics of the system have been extensively studied. There are only a few exceptions to the problems of accurately determining the blood types in the individual and in the genetic patterns of inheritence. These exceptions are well known, and experience in a careful laboratory will not make errors in conclusions.

CHAIRMAN FENTON: Did you hear Professor Peterson say that, and I assume that this is what you were talking about regarding accuracy, you had to take ten to twelve tests. Are we talking now about the same thing he's talking about?

PROFESSOR PETERSON: I think so.

DR. MORRIS: Yes.

CHAIRMAN FENTON: To really have accuracy, you had to take ten or twelve different tests.

PROFESSOR PETERSON: It's not so much accuracy as it is the high percentage of probability.

CHAIRMAN FENTON: All right.

DR. MORRIS: In addition, the methods use standarized reagents. Reagents of good quality are available commercially and are licensed by the federal government. Because of the application in blood banking, competent technical personnel are widely available. The system of red cell antigens suffers only from one weakness, and that's a perceived weakness. I'll get back to that later. The red cell antigen systems are recognized as the basic method of paternity testing by the Joint Committee of the American Bar Association and American Medical Association, in their guidelines, "Present Status of Serologic Testing and Problems of Disputed Parentage," published in Family Law Quarterly, Volume 10, 1976, page 247. The majority of paternity testing laboratories in California as well as the rest of the country, and the rest of the world, use red cell antigens as a basic tool in paternity testing. It is unfortunate that the use of this method is in jeopardy in California due to unfortunate case law. Now let me go through what we've done here. Under enzymes and proteins...

ASSEMBLYMAN STIRLING: That's the same case that Professor Peterson was talking about.

PROFESSOR PETERSON: Dodd v. Henkel.

ASSEMBLYMAN STIRLING: While we cannot use the red cell antigen test, we only can use the HLA testing because it was not perceived to be a blood test.

CHAIRMAN FENTON: I understand. I was just very interested in his description,"unfortunate case law." Go ahead.

DR. MORRIS: Under the first enzyme and protein system GC, we use the data from a hypothetical case in which the mother was type "2-1," the child was "1" and therefore we know that the biological father, whoever he may be, must possess the gene "1" which I've put in the obligatory gene column in red. The obligatory gene is a gene that we know that the biological father must possess. In a similar way, for all of the seventeen systems we've listed the obligatory genes. What we have done is we've created a substantial description of the biological father. We don't know how old he is; we don't know how tall he is, but we know he must possess all of the obligatory genes in these seventeen systems. If he was lacking any one of those genes, he would be excluded.

ASSEMBLYWOMAN MAXINE WATERS: Excuse me, Mr. Chairman.

CHAIRMAN FENTON: Ms. Waters.

ASSEMBLYWOMAN WATERS: Enzymes and proteins ACP?

DR. MORRIS: Acid phosphatase.

ASSEMBLYWOMAN WATERS: If you show that the blood types the mother and the child possessing "A" and "B," whatever that may be, the father must possess "A" or "B"?

DR. MORRIS: Yes, the child could have gotten an "A" from the mother in which case the true father must have contributed "B," or the mother could have given a "B" to the child in which case the true father must have contributed "A."

Now it's interesting to ask the question how close a description of the alleged father do we have at this point. We can answer that question mathematically because we can compute in each of the systems the percentage of Hispanic men who carry obligatory genes in each system. In the GC system, the obligatory gene is type "1" and 95.3 percent of men carry this gene. Similarly, this calculation is done for all of the seventeen systems, and if you will note here the percentage of men who carry obligatory genes in HLA is very much smaller than in any of the other sixteen systems. This is an indication of the power of this method in paternity testing. In fact, the power of exclusion of HLA is equal to the combined power of exclusion of the other sixteen systems. To obtain the percentage of Hispanic men who possess all the obligatory genes in all seventeen systems, we simply multiply together the column on the right and, if you'll flip that open, the product comes out .00113. What this means is that man would have odds of 885 to 1 in his favor of being excluded in one or more of the seventeen systems.

ASSEMBLYMAN STIRLING: May I just point out to the members of the Committee, this happens to be a case that Dr. Morris has this week. You say, "Why the Hispanic man?" Because it must involve that fact.

DR. MORRIS: The alleged fathers here are Hispanic.

CHAIRMAN FENTON: What you're saying is that if the alleged father is Hispanic and he's missing out on one of the seventeen systems then is it 885 to 1 that he's the father?

DR. MORRIS: No, if the mother has falsely accused the man, the odds in his favor of being excluded by one or more of these systems is 885 to 1.

CHAIRMAN FENTON: Well, if he's excluded by one of the systems is he excluded?

DR. MORRIS: Yes. On the other hand, the true father wouldn't have any chance of being excluded by one or more of the seventeen systems. So this is a measure of...

CHAIRMAN FENTON: But also, certain non-fathers would not be excluded too. What number is that?

DR. MORRIS: I'm making no assumptions other than the mother has named a man. There are two possibilities, either he's the father or he's not the father. We haven't tested the man yet. If he's the father, this method offers an 885 to 1 chance that will exclude him. If a man feels that he is not the father, then he should feel comfortable that these methods, although not perfect, have an 885 to 1...

CHAIRMAN FENTON: Well, suppose I'm the accused father now, and somehow or other I got tested by all seventeen systems. This is as exact as you can get. For the moment. It's very highly exact; yet, some individual is going to get caught up sometime or other.

DR. MORRIS: In this particular case if he is not the father, there is 1 chance in 885 that a miscarriage of justice might occur if the court felt only on the basis of this evidence he was the father, but there is other evidence. Moreover, a man who feels that he's not the father can be tested in still other systems. This does not exhaust the number of systems available for paternity testing.

CHAIRMAN FENTON: Well, let's take the case you're in, if you can talk about it. Let's assume the defendant has maintained that he is not the father.

DR. MORRIS: Yes, that is correct.

CHAIRMAN FENTON: I assume he has not been excluded because otherwise you wouldn't be bringing the case. Therefore, he is potentially the 1 of the 885.

DR. MORRIS: If he's not the father.

CHAIRMAN FENTON: You've got a paternity suit in which your defendant is accused of being the father. You run seventeen tests, and he's not been excluded under any of the seventeen tests because if he were the case wouldn't be brought. It would be dropped. Right? Am I correct so far?

DR. MORRIS: Yes.

CHAIRMAN FENTON: There is also the possibility that he's not. So now has he demanded other tests? When does he get the opportunity to demand other tests?

DR. MORRIS: According to the Evidence Code, he could demand them any time he wants.

CHAIRMAN FENTON: If you can tell us, has he asked for the other tests?

DR. MORRIS: He has not asked us for them.

CHAIRMAN FENTON: How many more tests are there? I'm just curious.

DR. MORRIS: Well, in cases in which the answer is not clear-cut for us, we send specimens for consultation to another laboratory in which an additional five or six tests are done.

CHAIRMAN FENTON: We're now clear-cut as far as exclusion is concerned. He's not excluded.

DR. MORRIS: There is a total of about sixty systems that are used in paternity testing in the world.

CHAIRMAN FENTON: You're not answering me.

DR. MORRIS: Yes, I am.

CHAIRMAN FENTON: Let's go to Orange County, okay? I'm the defendant. You now have found me not excluded. I now have a smart attorney who says, "Hey, hold it." How many more tests can you give me in Orange County now? How many more can I have?

DR. MORRIS: There are no tests in Orange County; you have to come up from Long Beach.

CHAIRMAN FENTON: How many tests can I demand?

DR. MORRIS: All I can answer is this. There are about sixty systems that have been used in paternity testing. I presume that these tests are available in a combination of laboratories throughout the world. They are not available in our laboratory. We've done everything that we can.

CHAIRMAN FENTON: I understand. You made a statement and I listened to you, contrary to what you may think -- we do listen. When you said that the defendant -- you can coach him, it's okay, David. (Laughter) The defendant now has not been excluded. So, he's the one for the moment, right? All seventeen tests in this case...

DR. MORRIS: He's not the one. We're not...

CHAIRMAN FENTON: No, no, no. What I'm trying to say is that he's the one who has not been excluded in the seventeen tests. You also said that the Evidence Code permits him to get more tests. Right?

DR. MORRIS: Yes, sir.

CHAIRMAN FENTON: How many more tests? How does he get them? When does he get them? That's the only question I ask you.

ASSEMBLYWOMAN WATERS: Mr. Chairman, if he's got enough blood he can take all sixty. (Laughter)

CHAIRMAN FENTON: Very good, very facetiously said. I don't disagree, but I'm just curious.

DR. MORRIS: If I was called by this man's attorney, I would suggest that there are some additional tests that he could get in Minneapolis, and we would be happy to forward specimens. There are some additional tests that could be done at UCLA, and we would be happy to forward specimens if that were the case. Beyond that, I would ask around. I would like to know how much money he would like to spend to try to get excluded.

CHAIRMAN FENTON: At this point it would depend on the cost to be borne by the defendant. Correct?

DR. MORRIS: Yes.

CHAIRMAN FENTON: Incidentally, if he wins the case with all these costs, is the cost then shifted to the plaintiff? David. Just a question of curiosity. Go ahead.

ASSEMBLYMAN STIRLING: We'll have witnesses who can testify to that.

CHAIRMAN FENTON: Good. If I'm in a field that you're not, just tell me, Doctor,and we'll go on. So don't be concerned with that.

DR. MORRIS: All right. Let me go on with the development of this case. In this case, the mother named two men as the possible father, both of whom are Hispanic. Man number one is excluded on the basis of five descrepancies found in the blood types. Discrepancy was found in the Rh system, in the Kidd system, in the Glyoxylase system, and the Esterase D system, and the HLA system.

CHAIRMAN FENTON: If you had only found one, would he have been excluded on this case?

DR. MORRIS: There are two types of exclusion which are known as "first order" and "second order." The second order of exclusion can be explained by a rare blank, an uncommon blank. It's not taken to be a definite exclusion. We had two second order exclusions here. We had three first order exclusions that could be only explained by a rare event, such as a mutation, which is estimated to occur perhaps one in fifty thousand times. Any one of those three first order exclusions would serve to exclude.

Now let's look over the second one. The second man was found to have obligatory genes in all seventeen systems so he is not excluded. He falls into one of two categories. Either he is the father,or he's that one unlucky man out of 885 who is falsely accused but is not excluded. We cannot decide in the laboratory which he is, but we can, to help answer the question, do a likelihood of paternity calculation. The likelihood of paternity calculation admits for the possibility of a third man because if these are the only two men who had intercourse with the mother during the period of time the child was conceived, we're all done. It must be man number two. Clearly it's not man number one. We have to assume that one or more men also had intercourse with the mother.

CHAIRMAN FENTON: Other men.

DR. MORRIS: Yes. We do this because first of all it's always a possibility,and the likelihood of that depends upon the other evidence presented in the case. We can't decide whether it's more or less likely. There are several ways to do likelihood of paternity calculations. This is the way we like to do it because first of all the calculations are relatively easy, and secondly the calculations are explainable to a non-technical audience. What we do is compare the chance that a random sperm from the alleged father would possess the required genetic information to the chance that a random sperm from a random man of similar ethnic background would possess the required genetic information. In the sixteen systems we have here, excluding HLA, we find that about 4 percent of sperm from the alleged

father would have the required genetic information. Only about one sperm in two thousand from a random Hispanic man would possess that genetic information. If we assume a model in which during the time the child was conceived, the alleged father and one other man of a similar ethnic background had intercourse with the mother, that the two men had equal access to the mother, and that the alleged father is of average fertility, then this translates into a ratio of 85 to 1.

CHAIRMAN FENTON: Same method?

DR. MORRIS: Yes, similar ethnic group. We could do this calculation for other ethnic groups that comes out very closely similar.

CHAIRMAN FENTON: How can you? With other ethnic groups, you don't start with the exclusions, do you?

DR. MORRIS: No. Exclusion doesn't depend on the ethnic background.

CHAIRMAN FENTON: Non-Hispanic has different probabilities than exclusion so you couldn't do it at this point. You would have to go back and do your...

DR. MORRIS: You would do separate calculations for each ethnic group. For instance, we could compare this Hispanic alleged father to a random Oriental man. We could compare this alleged father to a random black man. Without any evidence from the court, we make the assumption that the second man, the random man, may have had access from others of similar ethnic backgrounds. If the court would direct us otherwise, we would be happy to make the calculation according to the model of the court. The conclusion we come to in the sixteen systems of red cell antigens and enzymes and proteins is that a random sperm from the alleged father is eighty-five times more likely to carry a required genetic information than a random sperm from a random man from a similar ethnic background. That translates into a likelihood of paternity, based on that evidence, of 98.8 percent. If you look at the HLA data, a random sperm is forty-eight times as likely to carry the required genetic information in HLA as a random sperm from a random man of a similar ethnic background. Combining the data, a random sperm from the alleged father is about four thousand times as likely to carry the genetic information in all of the systems as a random sperm from a random man of a similar ethnic background. If we presuppose that these two men had equal access to the mother and that the alleged father is of average fertility and so forth, that translates into a likelihood of paternity of 99.97 percent. If there was no random man, we have a certainty that the alleged father is the true father.

CHAIRMAN FENTON: 99 what?

DR. MORRIS: 99.97 percent.

ASSEMBLYWOMAN WATERS: To what degree will disease or anything else distort the information in the systems that are here?

DR. MORRIS: There are modifications in red cell antigens in patients who have leukemia and patients who have colon cancer that can

change the blood types; however, these kinds of situations would be uncommon in the normal healthy person who...

ASSEMBLYWOMAN WATERS: I'm not interested in the strange or extraordinary. I'm interested in those diseases and other malfunctions that would result in distortions, particularly as it relates to traits that may be dominant in some ethnic background, sickle cell anemia other kinds of things. To what degree would that distort your systems information?

DR. MORRIS: Those would be very rare.

ASSEMBLYWOMAN WATERS: Could you give me examples of ones you know about -- not the extraordinary -- but could possibly impact the information?

DR. MORRIS: Well, yes. In patients with carcinoma of the colon, sometimes if they're group "A" genetically the bacteria would overgrow the colon, will act on the blood group substances, and cause a reaction that appears to be "B." But we routinely do other tests on the serum of patients that we're typing in ABO, and we would expect to identify those all the time.

ASSEMBLYWOMAN WATERS: What other kinds of common blood diseases would be familiar to most people in this audience?

DR. MORRIS: I can't think of any exceptions of disease modifications. Perhaps one of the other witnesses who follows can.

The point I wanted to make here is obviously the likelihood of paternity increases almost geometrically with the number of systems tested. This speaks directly to the perceived inadequacy of the system of red cell antigens. The power of exclusion in red cell antigens is approximately 70 percent. That means that if we test only in the six red cell antigen systems we expect to exclude only about 70 percent of falsely accused men. The men who are not falsely accused will have a likelihood of paternity that is relatively low, perhaps about 70 percent. In the case of Dodd v. Henkel, this is the major reason why the data was thrown out by the court, because of the low likelihood of paternity. As we have seen, we can combine the different methods of paternity testing to achieve a high likelihood of paternity. In one way that acts against the alleged father, but on the other hand the reason we do so many tests is to try to exclude him. After all, the more tests that we do...

CHAIRMAN FENTON: How many tests were done in the case to which you say there was an "unfortunate" decision? How many tests were done?

DR. MORRIS: I believe, although I'm not certain, that that was the basic six red cell antigen test.

CHAIRMAN FENTON: As opposed to seventeen?

DR. MORRIS: Seventeen in this particular case.

CHAIRMAN FENTON: In the "unfortunate" court decisions, did they use all these seventeen tests?

DR. MORRIS: No, based on red cell antigens only.

CHAIRMAN FENTON: I see, so it was an unfortunate presentation in the case. They should have used, and you may very well be correct, seventeen tests. We may not have had the "unfortunate" case law that you're referring to.

DR. MORRIS: That's right. I would like to make two recommendations for you in your considered legislation. First, I think it is important that the law explicitly recognize all scientific methods for paternity testing, including red cell antigens, HLA and the enzyme approaching polymorphisms. I think it would be worthwhile if the law recognized that other systems are likely to be developed, and they should be included when they are shown to be scientifically acceptable. Second, I think there is a need for the law to explicitly forbid the arbitrary inadmissibility of likelihood of paternity calculations simply because a judge might not understand them or might not feel comfortable with them.

CHAIRMAN FENTON: Are you talking about at least seventeen tests? Is that what you're referring to? Are you referring to requiring six or four tests?

DR. MORRIS: What I'm referring to is that a judge might say a low likelihood might be prejudicial. I wouldn't argue with that, but I would prefer it if judges couldn't say that they didn't like any likelihood calculations, no matter what they were, simply because they didn't like them.

CHAIRMAN FENTON: In your recommendation, are you asking for a minimum of these seventeen tests?

DR. MORRIS: No, I'm recommending a bar on arbitrary inadmissibility.

CHAIRMAN FENTON: Let me ask you what number are you recommending in the test, because you're giving us a dissertation based on seventeen tests and...

DR. MORRIS: I'm giving you an example based on seventeen tests. Although on the average the power of exclusion of red cell antigens is only about 70 percent if in the red cell antigen system the child acquired an unusual trait from the biological father, the likelihood of paternity could be 99 percent in red cell antigens alone so there is no reason to specify the minimum number of tests. You might want to specify a minimum likelihood and then the testing would go on until that likelihood was achieved, but you cannot predict how many tests that will take. It might well be, for instance, in the Kell system that you could get an extremely high likelihood by doing one test if, in fact, the child received an unusual antigen that the alleged father possesses.

CHAIRMAN FENTON: What was the likelihood in the "unfortunate" case?

DR. MORRIS: I believe the number quoted was about 85 percent.

CHAIRMAN FENTON: You think that's sufficient?

DR. MORRIS: I have no recommendation as to what a reasonable or likely likelihood of paternity calculation is because one cannot interpret likelihood of paternity calculations without reference to the other data in the case. Let me give you an example. Suppose a man is accused of paternity, the evidence clearly shows that he was living with the woman, the woman denies that any other man was involved, and the man issues no evidence that such another man was involved. In that case, I think the court should pay attention to an 85 percent likelihood of paternity. Given the other evidence in the case, one cannot interpret the likelihood of paternity calculation without reference to the other facts in the case. The laboratory operates in a vacuum. Okay? We make certain standard assumptions that may or may not have validity for the particular case. We would like to have guidance from the court. If the model was that the alleged father was Hispanic and the mother had intercourse with two Japanese and a Korean and a black man during that week, we could come up with some sort of a reasonable likelihood of paternity based on that model. In general, we're given no model so we...

ASSEMBLYWOMAN WATERS: Would you repeat that?

DR. MORRIS: Sure. We could set up a model, a Hispanic man, and the evidence in the case suggests that during the week the child was conceived (conception takes place during a five to six day period of time) the mother had intercourse with the alleged father twice and with one Chinese man, one Japanese man, and one black man. Although it would be a lot of work, we could do that calculation.

CHAIRMAN FENTON: Well, would you if the evidence were presented?

DR. MORRIS: If we're asked to, definitely.

CHAIRMAN FENTON: I see. In these cases, I presume, David, if it's a civil suit, the attorney representing the plaintiff makes the request for tests and pays for them.

ASSEMBLYMAN STIRLING: Well, except in the exclusion situation, but to answer your specific question, yes.

CHAIRMAN FENTON: Normally, I say.

ASSEMBLYMAN STIRLING: The defendant will ask for the test for exclusion purposes.

CHAIRMAN FENTON: We have the code section [Evidence Code Section 897] that says that when the defendant calls for tests, all he gets is ordinary witness fees. You can really get stuck. You can only tax the plaintiff as costs -- ordinary witness fees.

ASSEMBLYMAN STIRLING: Perhaps it would be interesting just on that point if the doctor could indicate what that particular hospital charges.

DR. MORRIS: Well, our basic charge per patient tested is $125 per individual, normally $375 per case involving one child, the mother and one alleged father.

CHAIRMAN FENTON: No matter how many tests you do? If you do one test, or seventeen or twenty the same cost?

DR. MORRIS: Yes, we test until we feel we have exhausted all the possibilities...

CHAIRMAN FENTON: For the same costs.

ASSEMBLYWOMAN WATERS: I'm not sure exactly how to frame the question, but what I'm interested in learning a little bit more about is what happens in cases where the ethnicity is not clear. For example, Dave Stirling can be 5 percent black or Spanish or whatever and a number of males could be that, and a number of males a female could be involved with could be that. It's quite common that, you know, people are made up of many ethnic backgrounds. Could you just discuss with me what this means in terms of your tests?

DR. MORRIS: Okay. First of all we take a look at the gene frequencies in our local population here, and we use gene frequencies that were derived by Dr. Myhre, who will be a witness here later this morning. Those gene frequencies have determined a large number of people who have, at least some of them, presumably, the kind of diversity we have that you're trying to account for. As a practical matter, when you use a lot of systems, when you use seventeen systems, differences in the ethnic backgrounds of the possible random man tend to disappear because fluctuations in gene frequencies for one of the seventeen systems tend to get balanced out. For instance, in this particular case here, and I'll give you an example, the likelihood of paternity was 98.8 percent in the sixteen systems for a Hispanic man, and we did the calculations for three other men and the calculations ranged from 97.8 to 99.9. The way to answer your question is to do the calculations assuming several different ethnic backgrounds; and when you do so,you're testing a lot of systems. The numbers come out pretty close.

ASSEMBLYWOMAN WATERS: Would you give us a definition of "gene frequency"?

DR. MORRIS: Sure. What we do here is test a large number of healthy people, usually blood donors, of a particular ethnic background...

ASSEMBLYWOMAN WATERS: Who are supposed to be of a particular ethnic background, and out of that comes a description of what someone who says they belong to that population should look like.

DR. MORRIS: The average person because remember if we choose as an ethnic background Hispanic, most Hispanics in Southern California will be Chicano.

ASSEMBLYWOMAN WATERS: I don't know, I mean I don't know.

CHAIRMAN FENTON: Theoretically.

DR. MORRIS: That's true. We ask the people tested to indicate

the major ethnic group. If they indicate Hispanic even though they may not be Hispanic, maybe they're Guatamalan, it's still likely that the mother, unless we have evidence to the contrary, did not have intercourse necessarily only with the alleged father and one other Guatamalan. She might have intercourse with that Guatamalan man and a random Hispanic man.

ASSEMBLYWOMAN WATERS: Is there some laboratory or hall of gene frequencies that you refer to?

DR. MORRIS: Well, most laboratories determine their own gene frequencies on their own population.

ASSEMBLYWOMAN WATERS: I see, so it's not just one standard that is used for gene frequency but a number of standards?

DR. MORRIS: Usually, a laboratory will determine its own gene frequencies for its own local population.

ASSEMBLYWOMAN WATERS: I see.

UNKNOWN: In an area like Southern California, you would have a fairly substantial gene frequency chart for considerable information.

DR. MORRIS: There is considerable information available about the Southern California population. Even though you are quite right that just because an individual puts down that he is black...

ASSEMBLYWOMAN WATERS: Or white.

DR. MORRIS: ...that there could still be a mixture of genes. But that's all taken into account. I mean that represents the heterogeneity within that sub-group.

CHAIRMAN FENTON: I want to thank both those witnesses. I got a lot of interesting information I didn't know. I assume you told the rest of your witnesses, David, that each of them is to speak on a particular thing and not be redundant. We want to hear something new and something different.

ASSEMBLYMAN STIRLING: Mr. Chairman, I think that some of the other witnesses, particularly along the medical line, are on specific types of testing.

CHAIRMAN FENTON: Your next witness, David.

ASSEMBLYMAN STIRLING: Mr. Brian Wraxall, Executive Director of the Serological Research Institute.

MR. BRIAN WRAXALL: Mr. Chairman, ladies,and gentlemen, just to give you a brief idea of why I'm here, my background and the things that I do is the use of blood grouping in criminal cases where we in fact do blood grouping on bloodstains and body fluid stains. These things we do use occasionally in paternity, but the majority of the work that we do is...

CHAIRMAN FENTON: How do you use them in criminal paternity cases?

MR. WRAXALL: Not so much criminal paternity cases, although we can do that, if you had an incest case or something like that. Our main use of the blood grouping testing that we do is on bloodstains and body fluid stains in cases of rape, murder, this type of case.

CHAIRMAN FENTON: Let me understand something. Let's go back to permitting blood tests in criminal paternity cases. You say they are permitted in incest cases.

MR. WRAXALL: As far as I'm aware, yes. I think Dr. Morris has covered a great variety of the things that you want to know. My presentation will be fairly brief, and I'd like to first of all concern myself with the available blood group testing systems that show the probability of paternity and to what extent each of these systems is scientifically reliable as evidence of paternity. Any genetic marker or blood grouping system which shows reasonable differences between individuals and is genetically inherited, as previously described, is potentially useful in paternity testing. In 1976, the Joint Review of the American Medical Association and the American Bar Association, to which Dr. Morris referred, showed that there were and recommended that there were potentially sixty-two different immunological and biochemical systems available for use in paternity testing. Of these, the ABO and HLA systems are only two. I would like to present to you the possibilities of using other systems for paternity testing. Of the sixty-two genetic markers or systems that were recommended, many are not feasible for practical use in paternity matters, and I think this may answer the question that you had earlier on as to how many tests can be done. A lot of them do not occur with a very great frequency in the population, or require very expensive antiserum, or are very time consuming and therefore are not very cost effective.

CHAIRMAN FENTON: So if I were to understand, the more affluent people who are accused, who could afford it, could then go into more testing because you say that time is secondary to cost. I assume the less affluent or the poor person is, in civil cases, handicapped by not having funds.

MR. WRAXALL: Yes. It also depends on the laboratory, too, in that they may not be equipped to do all of the sixty-two tests that are available.

CHAIRMAN FENTON: But I understand that there are other tests but they're very expensive.

MR. WRAXALL: Oh, yes.

CHAIRMAN FENTON: Okay. Thank you.

MR. WRAXALL: It also relies very much too on the probability of exclusion. This has been touched on before, but just for definition, there's going to be a lot of talk about different percentages, and I think it's wise to understand when we're talking about a probability of exclusion. As a definition, the "probability of exclusion" is defined as the probability of excluding a falsely accused man of being the biological father of a given child. Probability of exclusion figures have been calculated for all genetic markers as recorded in the AMA/ABA guidelines. The higher the percentage of probability of

exclusion the more useful the system, and this is important when you're looking at that list. I would like to suggest a protocol for paternity testing as shown in this handout which I would like to distribute.[2]

CHAIRMAN FENTON: You just sit there. We'll get it distributed for you. Thank you.

MR. WRAXALL: The protocol is divided into four groups. The first group is the antigens, fairly well known by the courts and sort of generally accepted. Most of these were considered in the previous presentation, and I've excluded on there three of the six that were presented. My information is that those tests that were used have a fairly low probability of exclusion so I haven't included them in here; however, that does not exclude their use in paternity testing. The second group is the polymorphic enzymes, and next to the types I have got the probability of exclusion. As you can see, as you go down through them, as you combine the probability of exclusions, that figure gets higher. You can see in the antigens there's a combined probability of exclusion of approximately 56 percent. When you look at the enzymes, there's a probability of exclusion of 68 percent approximately. When you combine the two groups together, you get a higher figure of 86 percent, approximately. The third group is serum proteins. Again, these have been touched on before. There are a few more there than there was on the previous list. Combined probability of exclusion for the serum proteins is 59 percent. Then adding to the first two groups you get a combined probability of exclusion of 94 percent. Now the fourth group is the HLA, or Human Leukocyte Antigen testing. And I've given there a fairly conservative figure of approximately 90 percent. People using HLA testing will be able to give you a much more realistic figure as to what the probability of exclusion is using HLA testing. But if you combine all of those four groups together, you can see that you've got a probability of exclusion of 99.4 percent.

As I mentioned, I've omitted some of the antigens because of cost effectiveness. The enzymes and proteins, on the other hand, are fairly inexpensive to complete, and with recent developments, two or three of these enzymes or proteins can be typed together at the same type, making them much more cost effective. Combined probability of exclusion of the listed antigens, enzymes, and proteins as I said is 94.3 percent. Now statistically, out of every one hundred innocent defendants, six could not be excluded. However, if the HLA is included in the testing, then you have a probability of exclusion of 99.4 percent, meaning that out of every thousand innocent defendants, only six could not be excluded.

All of the systems outlined here are scientifically accepted and reliable and can be used in paternity testing. I'm unsure as to what extent these systems are used in the USA. I am aware that they are used extensively in England and Europe. I think Professor Peterson mentioned that they were used in Sweden, and I know they are used in other parts of Europe. And for this, your attention is drawn to a paper published in 1978 in the Journal of Medicine, Science, and Law, volume 18, number 3. The authors are Dodd and Lincoln, and they talk of the use of blood groupings tests in paternity. Their paper documents routine use of thirteen of the fifteen tests that I've outlined in this handout in British paternity cases.

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2 Appendix B

Now I'm not suggesting that all of the fifteen systems outlined in this protocol will be necessary in every case, but I suggest that the protocol as outlined can be followed until a definitive exclusion is obtained. At that point, analysis should cease. If the putative father is not excluded, the more genetic markers used, the better the evidence. This is presented as the likelihood of paternity which is expressed either as a percentage or as a ratio, both of these have been mentioned before. It is my view that the likelihood of paternity is not meaningful and can introduce bias unless the ratio is greater than twenty to one, or the percentage is greater than 95 percent. This means that the accused man is twenty times more likely to be the biological father than a random man. The more systems utilized, the greater the likelihood that a falsely accused man will be excluded. The more systems utilized, the greater the value of the affirmative evidence of paternity.

I've been asked to comment on several questions, and the first of these has to do with the advantages or disadvantages of the use of genetic marker evidence to indicate paternity. I can see no advantage to withholding scientific fact pertinent to the case from a jury. The oath taken in American courts is to tell the truth, the whole truth and nothing but the truth, and without that scientific evidence, to me the whole truth is not being presented. The second question is whether the assembly bill should specify HLA typing as admissible to establish paternity affirmatively. The rapid expansion of the number...

CHAIRMAN FENTON: What do you mean by "affirmatively?"

ASSEMBLYMAN STIRLING: It's for the purpose of allowing not only exclusions from blood testing but also to establish probability among those who are the alleged suspects. That was the part of the Uniform Act that was removed in California. It's allowing the blood test results as one item of evidence, together with the appearance of the child, together with the mother's comments, and so forth.

CHAIRMAN FENTON: Okay. I've got you, David. Thank you.

MR. WRAXALL: The rapid expansion of the number and kind of genetic markers available to scientists virtually guarantees obsolescence of an assembly bill which states and limits the genetic markers to be accepted in the California courts. Any genetic marker accepted by the scientific community because of its reliability should be admissible. We cannot foresee the changes that the next few years will bring. As a footnote and as a conclusion, I would mention to you that most of the genetic markers listed in the protocol that I've given to you are currently accepted as evidence before the criminal courts of America. I don't mean in terms...

CHAIRMAN FENTON: In California too?

MR. WRAXALL: Yes. I don't mean in terms of paternity testing. When we're talking about criminal matters, blood stain analysis evidence is used far more in other types of cases than paternity.

CHAIRMAN FENTON: Ms. Waters.

ASSEMBLYWOMAN WATERS: How are laboratories monitored, or how is the decision made that a laboratory is doing reliable work?

MR. WRAXALL: In terms of the ABO, the antigens, and the HLA, I understand that they have to be licensed under the Department of Health in California.

ASSEMBLYWOMAN WATERS: How are they monitored?

MR. WRAXALL: That I'm not sure of.

ASSEMBLYWOMAN WATERS: Would it be reasonable, and I'm really not being facetious, Mr. Chairman, at this point. The testimony that you've just presented indicated that there's no reason why you know this evidence should not be admissible in court because of the way our system works. Would it then be reasonable to say if in fact we moved to that point that information about the laboratory also be admissible? Their reputation...

CHAIRMAN FENTON: I'm sure with our laws of evidence you can question any witness as to his qualifications, his reliability. That's permitted, more particularly in criminal than civil, but it is permitted. You're always permitted to question the expertise of the witness and the method of testing.

ASSEMBLYWOMAN WATERS: So if the laboratory has a bad reputation...

ASSEMBLYMAN STIRLING: Just as you question the reliability of a Breathalyzer, the same way you question the types of testing...

CHAIRMAN FENTON: You can go into the background, the methods of testing, the reliability. You can bring in experts of your own to say that "so and so" lab has a bad reputation. You can do all of that, yes.

MR. WRAXALL: In fact every time I testify in criminal matters, I have to justify that I am competent to do the work...

CHAIRMAN FENTON: And they have a right to cross-examine him on his expertise and background and so forth if they want.

MR. WRAXALL: And even to make a motion that I should be excluded if they think that I'm not competent to testify or my area of expertise is not in this area.

CHAIRMAN FENTON: Thank you. Are you through?

MR. WRAXALL: Yes.

CHAIRMAN FENTON: Thank you very much. Before we bring up the next witness, I'd like to introduce Assemblyman Art Torres.

ASSEMBLYMAN STIRLING: The next witness, Mr. Chairman, members, is Dr. Byron Myhre, Professor of Pathology at UCLA.

DR. BYRON MYHRE: Thank you. I too shall try to be very brief and not take a lot of your time.

CHAIRMAN FENTON: Thank you.

DR. MYHRE: I would like to speak for the use of extended testing in paternity studies. For a long time, we have accepted ABO, Rh, and MN as acceptable systems, and all of us who do paternity testing have been frustrated by the fact that we do not allow more evidence into court. I can think of two cases of my own in which there is an exclusion, one in acid phosphatase and one with the Kidd group.

CHAIRMAN FENTON: Are you referring to civil or criminal cases?

DR. MYHRE: These were civil cases.

CHAIRMAN FENTON: Okay. Thank you.

DR. MYHRE: In each of these cases, it was an extended week long trial to get this evidence into court because there is no exclusion by ABO, Rh, and MN. This cost the client a tremendous amount of money. The other thing I would like to bring up is that high inclusion percentages (we've been talking about the inclusion percentages) also implies high exclusion. If the person comes out with a 99 percent chance of being the father, it means he also has a 99 percent chance of being excluded if he was not the father, or roughly. And therefore this allows us to be much more discriminating in removing the people who are not, in excluding the non-fathers.

CHAIRMAN FENTON: If you had this 99 percent probability, and the judge, looking at the other evidence as to accessibility and so forth, were to determine there wasn't a 50 percent chance that he is the father, would you agree that the judge then in effect would direct the verdict for the defendant, for instance?

DR. MYHRE: That social data must be included as part of it. We do know there are cases of a man being falsely accused and that could fit in there. So that must be included.

CHAIRMAN FENTON: Thank you.

DR. MYHRE: To illustrate the point though, I oftentimes use a little cartoon showing a young, pregnant woman saying, "The putative father -- Oh, yes, he had yellow curly hair. He drove a red convertible." Now that's not really much to go on, but if on the other hand, we know that the putative father also had a green shirt, brown pants and white shoes, we've now narrowed it down fairly well, and thus every time we find a new decision parameter we can narrow down the group of people that could be the father.

CHAIRMAN FENTON: Well, let me interrupt, if I may. According to Dr. Morris, he said that their lab charges I think one hundred and fifty dollars to do up to seventeen tests.

DR. MYHRE: Per mother, per child?

CHAIRMAN FENTON: Yes. And he also said when they go through

four or five tests and they come to the conclusion that they're at the 90-something percent, they stop. So what you're saying, with adding the white shoes and the green shirt and all that is , wouldn't it be wise that we recommend that we do the seventeen tests?

DR. MYHRE: Yes.

CHAIRMAN FENTON: It doesn't cost any more money now, and we're not doing it for his convenience. We're doing it for, because as you all say, the more tests you do, the higher percentage you get. And since it doesn't cost any more if we were doing what you recommend, wouldn't it be smart to recommend in the legislation the minimum number of those tests?

DR. MYHRE: Well, first of all, unless you do twelve or more tests, you will never get past the 90 percent mark. ABO, Rh and MN can never give you a result unless it's a clean cut exclusion. One exclusion, out. That's the end of it. But on the other hand, if you get no exclusion, the most of an inclusion percentage you can get is in the range of 50 to 60 percent. If you add all of the rest of the red cell systems that Mr. Wraxall said and has listed on the passout, which I didn't see, again you'll bring it up to 70, 80, adding enzymes. By the use of all the systems, you get up to 90 to 95 percent.

CHAIRMAN FENTON: When you say all the systems, you're talking about seventeen?

DR. MYHRE: Roughly sixteen, seventeen.

CHAIRMAN FENTON: Yes, that's what I say.

DR. MYHRE: So, in other words, if you want to get a high inclusion percentage, and at the same time a high probability of exclusion if he is not the father...

CHAIRMAN FENTON: Either way.

DR. MYHRE: ...you have to do a lot of systems. Now...

CHAIRMAN FENTON: Well, since the doctor who runs the lab says the charges are three hundred and seventy five dollars whether they do three or seventeen tests, the costs are the same, and we get more exclusion factor, then, as I say, if we're going to enact legislation, why wouldn't we recommend that they do a minimum number and set out the seventeen tests? That is my question.

DR. MYHRE: I would hate to see it specify systems because we may find a new one in the future that's even better. Now the Office of Child Support, when they listed the laboratories in their last Tempo as to who were -- well, not acceptable laboratories, but they just listed them -- they insisted that the laboratory be able to provide a 90 percent or better exclusion rate, which translated into about thirteen or fourteen systems at a minimum.

CHAIRMAN FENTON: But if we can get a 99 percent with seventeen tests, why shouldn't we do it? Why should we eliminate that other 9-something percentage?

DR. MYHRE: It will cost the client more money.

CHAIRMAN FENTON: That isn't what he said. That isn't what the doctor said.

DR. MYHRE: I believe if you checked in the Tempo their pricing is a bit unusual, in comparison with the others, that with most of them you'll find HLA is extra.

CHAIRMAN FENTON: Okay, I see.

ASSEMBLYWOMAN WATERS: Question, Mr. Chairman.

CHAIRMAN FENTON: Ms. Waters.

ASSEMBLYWOMAN WATERS: I raised a question about disease in relationship to the tests and whether or not it caused distortion. I would like to raise the same question with you about incest.

DR. MYHRE: As to if that could produce...

ASSEMBLYWOMAN WATERS: Distortion.

DR. MYHRE: ...distortion. Unless they had some abnormal red cell -- no, I can't see how it could. There are a few disease groups that are linked with blood groups. Most of these are very serious diseases, and many of them are fatal. If one of these were passed on in an incest, the same blood group abnormality could occur, but it would be highly unusual, and the sort of thing you would diagnose as the patient came in to have their blood count.

The question of cost did come up, and I did want to bring up one point on that, that in most laboratories it is cheaper to do a battery of tests at the same time. A significant amount of cost is in drawing the specimens, making sure that people are identified correctly, the waiting that is necessary, (because they never come in quite on the time they say they're supposed to) writing the final report, and therefore the idea of doing one test and then if not drawing another, and then another and another, is impractical.

CHAIRMAN FENTON: Can they do the seventeen tests with one blood sample?

DR. MYHRE: Yes, so it's very possible to do at least thirteen, send another sample out for HLA, do them all at the same time. From a cost standpoint, if you go through the Tempo you'll find that for red cells, enzymes, and HLA testing, it will run probably for most families, about seven hundred to a thousand dollars for all the testing. The last case that I heard of in which there was a settlement, the child support settlement was seventy-five thousand dollars for the child. So the amount of testing that we're talking about really is a pittance compared to what we're confronting this father with over the period of a lifetime, or 18 years. Therefore, I do feel that extended testing of some type or another is very cost effective.

ASSEMBLYWOMAN WATERS: Excuse me, but Mr. Chairman.

CHAIRMAN FENTON: Ms. Waters.

ASSEMBLYWOMAN WATERS: Mr. Stirling, as an attorney, would you not believe with this kind of information as it relates to the cost that there would be an equal protection question that could be raised about one's ability to defend oneself based on one's resources? Would you not be concerned about that?

ASSEMBLYMAN STIRLING: That is a possibility, Ms. Waters. I'd just as soon let -- there will be attorneys who are involved in these areas testifying shortly, and some of them will try and answer those questions. I'm really not prepared to answer them. Possibly.

ASSEMBLYWOMAN WATERS: All right. I'll raise the question as it relates to one's own personal resources...

ASSEMBLYMAN STIRLING: I'll tell you which one to ask that question.

ASSEMBLYWOMAN WATERS: ...and whether or not we're talking about the State's picking up the cost of that.

DR. MYHRE: I would like to bring up one last point, and that is the type of reporting the conclusions. As you heard this morning so far, and I'm certain you'll hear further, there is some variance on how these percentages are presented to the court. Basically, they come out within a few percentage points of each other, but there is some difference. The American Association of Blood Banks, of which I am the immediate past president, has requested a grant, and we've been told in all probability we'll get it, through the Office of Child Support to have an international symposium to try to come up with a standardized method of reporting inclusion percentages. Therefore, I think there's an excellent possibility that in about one to twenty years that there will be one uniform method of reporting these, so the confusion with the jury will no longer exist.

CHAIRMAN FENTON: Well, that's not necessarily true. As long as you have attorneys, there will be confusion to the jury, but that's something else. (Laughter) I know. I'm just kidding.

DR. MYHRE: I have no other comments.

CHAIRMAN FENTON: Thank you very much, Doctor.

ASSEMBLYMAN STIRLING: The next witness, Mr. Chairman, is Domenico Bernoco.

CHAIRMAN FENTON: David, while your next witness comes up, I want to thank all your witnesses because we're getting a lot of, I think, very important information which a lot of us, including myself, didn't know. Hopefully we'll be able to digest and understand it. They are all heeding the admonition and not being redundant.

ASSEMBLYMAN STIRLING: Mr. Chairman, may I just ask, for the sake of time, if Dr. Mickey and Judy Bond might also come forward because they will all be testifying about the HLA testing method. It might be better if they were all up at the same time because they're talking about the same method.

DR. DOMENICO BERNOCO: Mr. Chairman, ladies and gentlemen. I will try to quickly summarize what we know today about the HLA. We have heard a lot about HLA that I consider extremely important to give an idea why today the HLA is considered a good method to use in paternity evaluation, in paternity exclusion.

The HLA started approximately in 1954, when for the first time Dauset in Paris demonstrated that using sera of polytransfused people, he was able to detect at the surface of the leukocytes, the white cells, a specificity that was present in the French population with a frequency of 70 percent, phenotype frequency. That means how many individuals tested were positive with these particular reagents. He demonstrated immediately that this specificity was strictly under genetic control, not through family analysis but using the monozygous twins against the dizygous twins, indicating that the monozygous twins always carried the same specificity -- either they were both positive or both negative. When not identical twins, sometimes they were both positive or both negative; sometimes one was positive when the one was negative. Because of the complexity of the HLA, people working in the field decided to get together and to start to have the histocompatibility workshops, international workshops. The first was held in Durham, North Carolina in 1964, organized by Dr. Amos,and the disagreement was as such that they didn't publish any joint report. But in the meantime, a new segregant series was described by Van Rood, the system 4. The individuals were classified either 4a, or 4b, or both. No individual was negative. So in this case the HLA was not very discriminating.

It took practically four international workshops before the first HLA specificities were recognized at the international level, and there is a committee organized by the WHO, the World Health Organization, that is in charge to evaluate these antigens after the international collaboration and to decide whether to accept the newly described antigens or not. For example, in 1970, eight specificities were ascribed to the locus A (it was already mentioned before what a "locus" means; I hope I will not use too much laboratory jargon and you can immediately stop me) and eleven specificities to the B locus. In '72, eight new specificities were added at the A and three at the B locus. But in 1975, a new locus appeared, the C locus, a third locus located on the HLA chromosomal region. In 1977, no new specificities were added at the A locus. We added eleven at the B, and now the fourth locus appeared, the DR locus. The specificities under the control of this locus are expressed only in a sub-population of lymphocyte, the so-called "B lymphocyte," the bone-marrow-derived lymphocyte. In 1980, no new specificities at the A locus, nine specificities at the B locus, and two more at the C, and three more at the DR locus. In total, we have twenty specificities at the B, eight at the C, and ten at the DR locus. Now the frequency of the blank, the undetected allele, that gives trouble in paternity evaluation, is reduced to less than 2 percent for the A and the B locus. But these undetected alleles are still around 25 percent at the C locus and around 15 percent at the DR locus. So for paternity evaluation, usually we use only the specificities detected at the A locus and at the B locus.

It was calculated in 1978, after the international workshop of '77, that if we have eighteen alleles at the A locus, twenty-seven at the B and so on, if we calculate the average HLA heterozygosity (that means the percentage of randomly typed individuals showing two

well-known specificities at each locus) we will find this as being 86 percent for the European Caucasoid at the A locus, 92 at the B, 73 at the C, and 87 at the DR. As you can see, we have a lot of heterozygosity so we usually can detect all the antigens present in one single individual. In the African black, the A locus is greater than in Caucasians, but this is lower for the B locus and these variations are related to the frequency of the specificities in a given population.

Here is a classical case of a family where we have the father, that in one single chromosome, we will initially call "haplotype," carries the specificity A1, B8 and in the other chromosome A2, B12. So he is heterozygous at the A locus, A1 and A2, heterozygous at the B locus, B8 and B12. The same for the mother. So out of this family, we can have only four types of children. The haplotype A1/B8 of the father could be associated with A3 and B7, AW 24 and B5. These are the only four combinations. So if the HLA is extremely powerful at the population level, it becomes less powerful in a given family. This is an important point that we have to consider.

However, sometimes we can have still another combination that is not reported. This is a point that is well known in genetics, and it is called the "cross over." Sometimes the A1 could recombine with the B12 or the A2 could recombine with the B8. This could happen in the father as well as in the mother. So we have a fifth combination, and these combinations are the most important combinations because they give us an idea of the order of this loci on the chromosome and how far apart these particular loci are.

Here we have the summary of the eighth international workshops that was held here in Los Angeles at the beginning of February. Practically a hundred and five laboratories participated so we received families from all over the world and twelve hundred families were presented. Out of this twelve hundred, two hundred families were presented as having one child as a recombinant,and we have tried to analyze all these families to reconstruct the chromosome map. Starting from the centromere, we were able to verify only a hundred and eight recombinants because in the majority of the families, the parents were not typed or some other information was missing. Now we know this chromosome carries at least seven loci, three of which (the GLO, the C2 and the BF are biochemical polymorphisms) are detected through electrophoresis variants and four loci serologically detected, the DR, as I mentioned, the B, the C and the A.

Here are reported the number of recombinants found as well as the positions that these particular loci have on the chromosome in a linear form. I don't go into detail to describe the figure.

We also know that the HLA is located on the chromosome number six. Here is the G-banding as it is the picture taken from the microscope. This is the schematic representation. And now we know that the HLA that is also called the major histocompatibility complex in humans is located exactly in this region of the short arm of the chromosome number six and it represents around 10 percent of the entire length of the chromosome.

When I was mentioning all these HLA specificities before, I didn't mention that some of the specificities detected today are really splits, subdivisions of previous specificities. And I will underline

the importance of this. At the top, we summarize the sera used to detect a given specificity, like in this case the A1. On the left, we reorder with the computer the different cells that were typed with these reagents. "Plus," means it is positive for the reaction. If we didn't put anything, it is negative. If it's zero, it was not tested. As you can see, the A9 could be divided in two parts. This part that we call AW23 plus this part that we call AW24, and the AW23 and the AW24 are completely included in the A9. Of these splittings today, we have three at the A locus, the A9, that is divided into AW23 and AW24, as I explained, the A10, the A19, and all the others are B locus specificities.

If now we are looking at the antigen frequencies, as I mentioned before, which is the number of individuals positive for that particular antigen, we don't make a distinction if that person carries a double gene dose or one single gene dose. So in antigen frequencies, we find that we have only one specificity, the A2, that is around 46 percent frequency. This cannot be a highly discriminating antigen. This is a very poor antigen in discriminating. But thirty-two specificities are in between 1 percent and 10 percent. But as we mentioned, AW23 and AW24 are in this category so practically the A9 will have the frequency of the sum of these specificities. So the more we split a specificity, the lower the frequency the antigen has, and the more powerful the HLA will become.

To reinforce this concept (I hope I am not too redundant) in 1970 an individual could be typed from the family analysis as having one chromosome A1, B5. The C and the DR locus were not determined. But when we arrive in 1977, now we find that the haplotype is A1, CW4, BW52, DR7, A26, CW6, B37, and DR2. Atthe early beginning, as I mentioned, we had the family analysis and we have seen that this individual with this particular genotype had a sibling, that in 1970 we were able to tell these two siblings had received the same two chromosomes from the parents. So they were HLA identical and when they were retyped in '77, they showed the same typing. But as for four other unrelated individuals that in 1970, who were looking HLA similar and we were not able to make any distinction, now by using the C and the DR locus we are recognizing that these individuals are unrelated. They are completely different, and they don't have anything to do with the two previous individuals, again reinforcing the concept that the HLA is extremely powerful at the population level but much less powerful at the family level because these two individuals, if they were accused of being the putative father of a given child if one cannot be excluded, the other cannot be excluded either. They will have the same HLA. This is an important statement.[3]

These chromosomal associations are not random. This is a very complicated diagram, but I want only to make the point that on the obscissa A, we reported the A locus specificities and their frequencies as found at the population level. And the same is for the obscissa B. Now, if everything is random, the frequency (ordinate) of A1/B7 must be identical and A1 and B8 because B7 and B8 have about the same frequency and A1 is in common. But as you can see,the A1/B7 is very low in frequency compared to the HLA A1/B8 which is extremely frequent. And the same we can read on the other direction (obscissa A). A1 and B7 are more frequent than A2 and B7, but A2 is more frequent than A1. And A3 and B7 are extremely frequent. So when we are calculating

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3 Appendix C

the percentage of paternity inclusion, we have to consider these frequencies for the statistical analysis to derive the most likelihood of paternity.

ASSEMBLYMAN STIRLING: Mr. Chairman, with the permission of the Chairman and the members of the Committee, perhaps I could ask Dr. Bernoco to be a little bit more general for the benefit of all of us. We cannot simply be as specific as you're getting into and comprehend it in this short time. Perhaps you could try to direct us to the value of HLA testing so we could understand. We are limited in our talents, to some degree. Thank you. I hope you're not offended by that particular attitude.

DR. BERNOCO: No, no. That is extremely important. To give still a quick idea to better characterize the HLA, here is a schematic representation of what we know already from the biochemistry point of view. We know that the HLA A and B loci specificities are composed of two different chains and in what chain specificities are located and that these chains start to be characterized in a very nice way from the chemical point of view. To...

CHAIRMAN FENTON: Summarize. (Laughter) So you'll understand, Doctor, what David said. You're a very erudite technician. We are very amateur in this, and I want you to know I was starting to understand it, but now I'm starting to get a little confused. So if you'll summarize for me and bring me back a little, I'm sure the rest, if I can speak for them, will agree, you understand. You know your subject very well, and I'm sure you didn't learn it in twenty minutes like you're trying to have us do. Seriously, so if you'll give us a summary,...

DR. BERNOCO: I'm very sorry.

CHAIRMAN FENTON: No, no, don't be sorry. It's very enlightening. Perhaps when we get the transcript, we might understand. I personally would like you to bring me back to where I was when I understood a little of it.

DR. BERNOCO: What I want to demonstrate here is that the HLA is not a peculiarity of the human. An analogous system is expressed in many animals. It was first described in the mouse. It is the most complicated as it is so far described in man, and it is already found in all these different animals. What I wanted to bring up is that with the HLA, as we understand now, we have a lot of data demonstrating that these specificities do segregate very well in the family, that the HLA a few years ago was not as powerful in discriminating at the population level as it is today, and my caution that if we are dealing with a particular family this HLA is not as powerful as it is at the population level.

To quickly summarize our experience in the HLA, and now we are coming down to the actual data that we found in the laboratory, here is the graphic of the HLA testing done in our laboratory. It reaches a plateau that is one hundred and eighty cases per month. Here is a table that was discussed earlier, and I should like to underline that in the first thousand consecutive cases we were able to exclude 25 percent of the men accused. Of the non-excluded, as it was reported

the percent probability of paternity was around 16 percent, over 99, 14 percent, over 98, and in the range that it will be considered not solved is 10 percent. So more than 90 percent of the individuals tested with the HLA had a percentage of paternity above 90 percent.

ASSEMBLYWOMAN WATERS: Could we impose on, Mr. Chairman, by way of a question to the speaker that to the degree there is something called "ethnic purity," your tests are more reliable, to the degree there is miscegenation or mixture of ethnicity that your tests become less reliable?

DR. BERNOCO: I would not consider it like that because I didn't underline one thing. When we were talking about the splitting of a given specificity, many times they are race-related. For example, the AW23 is practically absent in Japanese and many specificities are peculiar of a given ethnic group. So we can identify frequently the ethnic group by using the HLA. What I was saying is if, for example, an accused father has a brother the probability that that brother will be not excluded is 50 percent because it is 50 percent of the probability that two brothers will share one haplotype or one chromosome in common.

ASSEMBLYWOMAN WATERS: The brothers -- would you repeat that about the brothers again?

DR. BERNOCO: If a putative father has a brother, the probability that the brother will share one haplotype is fifty percent. So this is an extremely important point, that if the HLA is extremely powerful at the population level, it is not as powerful when the family is involved. So a mother can always accuse a brother of the natural father and the HLA could not exclude him. This is the important evidence that the court needs to understand.

ASSEMBLYWOMAN WATERS: Those are the kinds of things that I'm interested in pinpointing because while I have a great deal of respect for the research that has been, and how it has been, developed, I think it is important that we understand as a committee how many people could still be, in spite of all the research, wrongly accused. If we're talking about certain information being admissible, we need to understand very clearly how many people have the possibility of being identified wrongly, and that's really why my questions move to this. That's extremely important that this Committee understand that about the family in relationship to the information that you have presented. That's important information. Secondly, as it relates to the population, while I am impressed that you have been able to expand the specificity in the A category up to twenty and B category up to forty at this point, I have a feeling that in 1990 you will even be able to expand that more and to the degree you have more information, then your tests will be more reliable, but we are still limited somewhat despite the advance in what you have been able to specify. Thirdly, just let me say, I keep raising these questions about ethnicity because of changing populations and changing identifications. In Miami, Florida, for example, with the influx of Cubans and Haitians and blacks and whites, I cannot believe that the gene frequencies are identified in such a way that we know what is what in many cases and when you have migration from Florida, where you have a mixture of populations, Cuban, Haitians, brown, white, etcetera, who comes to Los Angeles in a paternity case, then I

want to know what that means. It should mean something decidedly different than the gene frequency information that you have about a Hispanic or a black perhaps in the Southern California area, or it could increasingly begin to mean something different.

DR. BERNOCO: About this ethnic group, as I mentioned before, we have an international workshop and we can derive these gene frequencies through the international workshop, and I don't have it with me but I can demonstrate, for example, the Caucasians in Italy have different gene frequencies than Caucasians in Northern Europe.

ASSEMBLYWOMAN WATERS: That's precisely what I'm getting at and the...

CHAIRMAN FENTON: But how about a Caucasian in Italy who has some German in him? That's what she's trying to bring up. I'm sure. Isn't it, Maxine?

ASSEMBLYWOMAN WATERS: I'm into something a little bit different because his gene frequencies in Africa, for example, would be reliable in certain parts of Africa.

DR. BERNOCO: Correct.

ASSEMBLYWOMAN WATERS: When we begin to have movements in significant numbers to this shore, for example, where we have Haitians and Cubans and blacks and others, say in the Florida area, then your gene frequency information would have to be updated because the end product of that configuration may be very different, and I suspect that you do not have 1980 gene frequencies that represent that kind of miscengenous population.

DR. BERNOCO: The only point that I wanted to bring is that out of all this comparison that we made, the gene frequencies vary, but the variation between the gene frequencies has a very small impact on the final outcome of the percentage included. Dr. Mickey, maybe you will comment on that?

There is variation of gene frequencies, but it is not as dramatic as it is when it is completely different.

ASSEMBLYWOMAN WATERS: Based on the 1980 information that you have?

DR. BERNOCO: Not exactly, because when we got the 1980 information, we compared it with the '77. We compared with the '75, and after, we have other comparisons. We have our local gene frequencies. We create our local gene frequencies, and the frequencies, comparing with all the other, are not too different.

ASSEMBLYWOMAN WATERS: Do you do gene frequencies in infinite combinations? And I say "infinite," I don't mean "infinite"; that's too much to ask anybody, but I would like to know if you could show us gene frequencies that have taken into consideration different kinds of combinations that are realistic in terms of the melting pot that we have in this country.

DR. BERNOCO: Okay. I think the answer was partially given already. When you have some doubt exactly as to what background that particular individual belongs, you usually do the computation using all the information available and frequently two or three different evaluations are given. We consider him as being a Causcasian. We calculate for the Caucasian. We consider him as being something else. We consider something else. But the most important problem is if the fact happened in Los Angeles, we can also consider the Los Angeles gene frequencies. We can also consider the gene frequencies that we find in this particular place because the random man could be anything so we can have this as the minimum and the other is more precise.

ASSEMBLYWOMAN WATERS: Yes, but the man could not have come from Los Angeles at all, and you're comparing him to the gene frequency information in the Los Angeles or Southern California area. It could be one of these people that I'm talking about that came from Florida who would not fit into your gene frequency pattern.

CHAIRMAN FENTON: What would you do in that instance, Doctor? That's what we're trying to find out.

MS. JUDY BOND: I'm Judy Bond. I'm the Supervisor of Paternity Evaluation at UCLA. In cases such as the one you're describing if an individual is of multi-racial background, we would consider all of the backgrounds that he is. For instance, if he's half-Filipino and half-Chinese, and I have cases quite frequently like that where you have a mixture of background, then Dr. Mickey has devised a formula by which I can calculate the probability of paternity on mixed race cases.

CHAIRMAN FENTON: But you left out one factor. Maybe I have problems in understanding this. I understood from what the doctor said that with an Hispanic or a black person, let's say from Florida, you've got a different situation than with the one from Los Angeles. Maybe I don't understand. Gene frequency, isn't that what you said?

DR. BERNOCO: The gene frequency could change.

CHAIRMAN FENTON: Wouldn't you have to then determine in addition to his being a half-Filipino and half-Oriental where he comes from too? Isn't that another factor you have to consider for his gene frequency?

MS. BOND: You would have to consider, for instance, if a person were of perhaps black heritage from Haiti, I would use the population from African black. If you weren't pure all black, for instance from Africa (he couldn't trace his lineage back that far,say he was a mixture of Caucasian), I would also do the calculation based on whatever mixture he could provide from his family tree, just what portion he was of what to let's say, black to Caucasian. I would compare the European Caucasian tables with the African black Caucasian tables, and I would also use the North American black and the North American Caucasian.

CHAIRMAN FENTON: Is there any difference between any ethnic group from any geographical part of the United States?

MS. BOND: No, there really isn't, except if they're really

isolated like, for instance, the Amish. We found that there are subtle differences, say for instance with North American Caucasians and European Caucasians. There are differences, yes, and Dr. Bernoco testified that there are differences. Some of them are extreme; some are subtle, but overall Caucasians are Caucasians and we have found that when we do comparative calculations they are pretty much the same. You wouldn't want to compare a Caucasian to someone of Asian background or black. You would want to get as close to their particular ethnic background as you can. But if you do compare, I'll say it again, African black and American black, we have found that the calculations do run pretty close the same.

ASSEMBLYWOMAN WATERS: I understand that, and that's very helpful except I think it is important to point out that in my consideration for all of this, this makes the information less reliable. Whereas I'm sure you do as good a job as you can possibly do, and you have a standard, kind of black and whatever, there are populations (I was just in Louisiana -- New Orleans -- a few days ago, working with another committee), there are populations there that are a mixture of French and Caucasian and black that would not fit into any gene frequency information as it relates to black and particularly when you talk about black as it relates to Africa or even Haiti where it changes from say Africa to Haiti. I would have difficulty in saying that they could be put into gene frequencies in this area, and the Los Angeles area has a significant, as they identify "Creole" population. That's this combination of French, white and black, and I don't know what that means in case of your testing.

MS. BOND: When we have had cases just as such as you have described in the Louisiana area where people do represent themselves as being Creole I will then try and then -- Cajuns or whatever the term -- I do go back into their family tree. I spend a lot of time in finding out who their grandparents were and who was French and who was this, so I would use...

ASSEMBLYWOMAN WATERS: There are a lot of people who don't give you that information, you know.

CHAIRMAN FENTON: There's nothing you can do then.

ASSEMBLYWOMAN WATERS: You cannot. There are populations of persons who identify themselves as Caucasian and who have lived for years as Caucasians right in this community that, in fact, have the combination French, black and white backgrounds that some people identify as Creole that people just consider Caucasian and they say they are Caucasian.

MS. BOND: That's very important, and I know when I draw blood from individuals in the laboratory I specifically ask them. I wouldn't look at you, for instance, and assume you are black or assume that you are Caucasian, or anything like that. I would say, "What is your racial background." It throws people. They think, "Well, can't you see?" I say,"I have to hear you say it. I want to know if you have any Indian background, black background, any Oriental that's just not obvious." I really...

ASSEMBLYWOMAN WATERS: ...tell you that their grandparents were black?

CHAIRMAN FENTON: Well, as a matter of fact, there's nothing you can do about that,unfortunately.

ASSEMBLYWOMAN WATERS: I know. There's nothing you can do about it, and they don't fit into the gene frequency. That's all; I just had to make that point.

DR. MAX RAY MICKEY: I think it may be the case that,since we do go by what people say they are the group that you're mentioning will have their representation in forming up the gene frequency. All of our local Caucasians, mostly self-proclaimed, and they are, of course, going to be a big mixture, but they will be -- I don't think there's any selection of the respondents there that weights them anymore than they will be weighted according to...

ASSEMBLYWOMAN WATERS: If you do a random sampling and I don't know -- you have not described to me how you get your gene frequencies yet, which would be important. If to determine the gene frequencies of white males, you go to Orange County, where your white male is a combination of European, .this, that and the other then, okay, that's all right. I mean you probably get a pretty good definition of what a white male is. But if you come to Los Angeles and you do your sampling right over here around Exposition and Jefferson between Arlington and Crenshaw, where the population could be heavily Creole,if that ends up being the gene frequencies for blacks then you're off, you're wrong, doesn't work. If you do your gene frequency in Florida, where there's a heavy population of Haitians, or parts of New York, and somehow that becomes the description of gene frequencies for blacks you're wrong, you're off, it doesn't work, and so that's what I'm trying to point out. I'm trying to determine if that makes a significant difference when you're trying to tie down paternity. I don't want these poor men accused unjustly. I don't want them to be stuck with eighteen or twenty-one years of responsibility that does not belong to them,and I know Dave wouldn't want that.

ASSEMBLYMAN STIRLING: This is just one item of evidence, and interestingly enough it's the HLA test, which is the only one they're talking about at this time, but what they're saying applies to the other tests. It's the only one that's allowed in the court today.

ASSEMBLYWOMAN WATERS: I understand that, but what we have to consider is when we get very talented professionals coming into courtrooms who are presenting information with average jurors we have to be careful because people do get intimidated by these experts who know so much and begin to take their word as gospel. That's why we have to be so careful about things like that.

CHAIRMAN FENTON: It works both ways. If your defendant can afford it,he has the experts on his side too, and so you get confusion from both ways or one way.

ASSEMBLYWOMAN WATERS: That's true.

DR. MICKEY: On this matter of the frequencies, I think it's relevant that through the various studies such as Dr. Bernoco was mentioning that the frequencies are really quite similar, that we have compared the results from several different studies using different

people from different populations -- they're not just the same people studied over and over again. The results will come out really quite similar...

ASSEMBLYWOMAN WATERS: How does your laboratory get its gene frequencies?

DR. MICKEY: Well, we do this through a calculation. A lot of the material we use is based on cases of paternity testing.

ASSEMBLYWOMAN WATERS: So, the people who come into your laboratory make up the basis for your gene frequency information.

DR. MICKEY: That's the bulk of it, right. Now, we have tested something like seven thousand paternity cases and that information is mostly available.

ASSEMBLYWOMAN WATERS: Over a period of?

DR. MICKEY: Over a period of five years. Like Dr. Bernoco was indicating, there are continually scientific advances so we continually have to update our data, but when we take the results and compare them with information that's gotten from various laboratories around the country, it's really about the same. If we compare it against European Caucasians, it will be roughly, substantially the same.

ASSEMBLYWOMAN WATERS: Where is your laboratory located?

DR. MICKEY: In Los Angeles, UCLA.

ASSEMBLYWOMAN WATERS: Where do your patients normally come from? These are welfare cases?

MS. BOND: Some of them are. Quite a few of them are, but they actually come from all over the state of California and all over the United States. Some of them are international. We do get some from overseas.

ASSEMBLYMAN STIRLING: We also have access to information, as I understand it, from other parts of the country where these tests are also being tried, down there so they had that information.

CHAIRMAN FENTON: It falls prey to the same criticism that Maxine has there...

ASSEMBLYMAN STIRLING: Not when you put it all together, it doesn't.

CHAIRMAN FENTON: Well, yes it does. I should let her speak for herself, and she can, but I'm in the same position she is. How do we know what ethnic mixture they are.

ASSEMBLYWOMAN WATERS: Beyond my question, Mr. Chairman, it now becomes the question of whether or not the information that's gathered for the gene frequencies is scientific information. It's not as you've described. You have testing that is each laboratory developing its own gene frequencies based on the number of people who

walk through that door; when I say "walk through that door," I mean that you actually do the testing on. Now, there's nothing scientific about that population or that sample you have, absolutely nothing.

DR. BERNOCO: The problem is also on the number you are using to derive the gene frequencies. The bigger the number the better it is, and the more uniform they come. This is why we're using large numbers of individuals. When I was talking about the comparison of the gene frequencies that we got in Los Angeles and what we consider Caucasian, it doesn't differ too much from the European Caucasian. This is the point because, as we were mentioning before, the more you restrict a population the bigger are the variations of gene frequency from one population to another. This is the point. We are trying to use the average and to have a large number where there is not much, not too much, variability in gene frequencies. If we are going to go downand we compare with the random man, we don't compare with the specific random man. We specifically compare with the random that are around.

ASSEMBLYMAN STIRLING: How does that affect the accuracy of the bill?

DR. BERNOCO: As I mentioned before, maybe Dr. Mickey can give an example. When you are dealing with gene frequencies of around one percent, the variation is not very big in the final outcome.

CHAIRMAN FENTON: Anything else, David, on these three witnesses?

ASSEMBLYMAN STIRLING: Unless they had something specific to add. I think what you have been hearing is what the Committee is concerned about.

CHAIRMAN FENTON: Okay, thank you very much. We will recess until a quarter after one, David.

(RECESS)

ASSEMBLYMAN STIRLING: Mr. Chairman and members, the next witness is Michael Barber, representing the Family Support Council of the California District Attorneys Association.

MR. MICHAEL E. BARBER: Mr. Chairman, there was a question that Assemblywoman Waters had but she was not able to be here.

ASSEMBLYMAN STIRLING: She had some question about equal protection.

CHAIRMAN FENTON: I would suggest that he answer it so it would be in the record.

MR. BARBER: I will certainly try to address that. Mr. Chairman, I have heard so much good testimony here I am going to try and keep it short because it will be redundant. I thought, particularly the testimony from the doctor from Long Beach squared almost completely with the position of the District Attorneys family support group. The only thing I would like to add is in terms of general information to that which he presented in relation to probability tables. I'm no ex-

pert, but it is my understanding that the American Blood Banks have probability tables that have nationwide applicability. Furthermore, at least as to red cell tests, the legislation that we have been talking about now has acceptance in about eighteen states or more and is being used. Those probability tables are being developed, if they don't already exist, for such diverse jurisdictions as Hawaii and Louisiana, to name just two that were raised in this discussion this morning.

I have to take exception to Professor Peterson's remarks, in part, in that he stated absolutely and categorically that red cell tests are not admissible in California. I differ with him in his interpretation of the cases and, at least in Sacramento, we have secured admissibility of red cell testing along with the HLA testing. That's precisely why I see us here. What is admissible in Sacramento is excluded in Riverside. What is admissible in a criminal trial for non-support in San Diego may be excluded in a non-support criminal trial here in Los Angeles. There is case authority, at least in relation to San Diego, to back the point that I'm making. As a consequence, some courts in this state are interpreting Dodd v. Henkel one way, to state that it is the intent of this Legislature that red cell tests not be admitted. Other courts are taking the position that Dodd v. Henkel essentially was a case based on a lack of inadequate foundation at the trial level, which is what it is referred to in the opinion, and, therefore, anything else that it says, particularly in view of the fact that the legislative intent is dissected and trampled on, if you will, in Cramer v. Morrison, is mere dicta and has no weight to be given to it. A child in Sacramento has a chance of getting all the evidence before the court; a child in Los Angeles may not. The state of the law, just briefly, as I said there are about eighteen states now -- it is not a question of California taking a whole new leap into the dark in terms of American law -- about eighteen states now have legislation that would parallel the legislation that has been before this Committee several times. These states are as diverse, as I said, as Hawaii, as Montana, North Dakota, Minnesota, Louisiana, Georgia, North Carolina, and the like. I won't list them all.

There is a second point where I have to differ and I wish to highlight the point for the record in relation to Professor Peterson's testimony.

CHAIRMAN FENTON: Mr. Barber, Mrs. Moorhead wants to ask you a question.

MR. BARBER: Sure.

ASSEMBLYWOMAN MOORHEAD: In the eighteen states, what's the longest any state has had that law. Is it something recent?

MR. BARBER: No, New Hampshire has had that statute since 1955. I can't give you Utah's date of enactment, but Utah enacted the same uniform act that New Hampshire did. They...

ASSEMBLYWOMAN MOORHEAD: And these allow any or all blood tests?

MR. BARBER: Any that is accepted by the scientific community.

That's the cutoff, whether or not the scientific community has accepted this test. A classic example of that is right here in California; it's Huntingdon v. Crowley [64 Cal. 2d 647 (1966)] and how far the art has gone in the last twelve years. In Huntingdon, the Kell test would have excluded an individual; that was not admitted. The Supreme Court upheld that lack of admission. Now, the same individual who testified against admissibility of Kell in Huntingdon in 1966, Dr. Sturgeon, in fact testified at a trial in Sacramento in favor of its admissibility.

One other point I wish to highlight in relation to Professor Peterson's testimony, and it's not so much as a difference as a difference in emphasis. As you heard from the doctor from Long Beach, there are in fact two separate statistics involved in this activity. One of them is the statistic of exclusion or inclusion, a cumulative statistic that assumes the individual may not be the father and tries to eliminate him by a progression of tests, seventeen from the Long Beach hospital. When that Long Beach doctor is done, that individual is only a member of a group of six out of a thousand. That statistic is not based on any a priori assumption, any 50 percent figure. We would hope that in drafting legislation that distinction is taken in light. As to the correlative probability statistic, the American Bar Association in conjunction with the American Medical Association in drafting its report recommended that below 80 percent the correlative statistic would be considered to have no value.

One other point that was raised by Mrs. Waters, and that is the possibility of an indigent individual being denied access to these tests. In fact, in the case of Michael B. [86 Cal. App. 3d 1006 (1978)], the courts have already taken care of that problem and made those tests charged on the county, at least initially pending final resolution if the individual is in fact indigent.

As I said, I don't want to take up too much of your time, but there are now forty-five hundred pending paternity cases in Orange County, three thousand in Sacramento. It is suggested by my friends from the social welfare department that as many as twenty-two thousand new paternity cases are reported a quarter. You have a difficult social problem here. Right now the only thing we're sure of in all the courts of the State of California, although as I say the rulings vary from county to county, is that the only correlative statistic that you can come up with, the only correlative evidence you can come up with right now is to hold that child up by the alleged father and say, "Does he look like the father, judge or jury." We think that the blood test, that both probability of exclusion and the correlative probability, if the individual is not excluded, provides far better evidence both from the mathematical side of it and from the scientific side of it than is now universally available in California. We hope the Committee will consider the bill that will once and for all resolve the problem of legislative intent in this area. Thank you.

CHAIRMAN FENTON: Thank you. Say "hello" to Herb Jackson for me.

MR. BARBER: Yes, sir, I will.

ASSEMBLYMAN STIRLING: May I just ask the witness to -- Mike, if you could make some comment about the effect that it may have on trials.

MR. BARBER: I can both draw on my experience and the experience in Colorado Springs. With general acceptance in this area in terms of admissibility in Sacramento, we had two paternity trials that were about to go last week. In one case, the expert that we draw on in Sacramento, Dr. Julita Fong, was cross-examined for better than two days in a deposition. At the end of that deposition, counsel was satisfied on the other side and stipulated to a finding of parentage. In the second case, a motion in limine was held as to admissibility. At the end of that motion before Judge Perluss, the judge ruled in our favor, and counsel again folded. Now that second motion did cost us $200 to $250. However, as opposed to a jury trial that might have gone three, four, or five days, it might have involved dragging an impressionable child into court and putting that child beside the parent and, as I said, going through this difficult display, no matter how discreetly done, that would have put a custodial parent on the stand and, even though that custodial parent may have been fully examined previously about personal aspects of her life in deposition, would have again put her through that drill in front of a jury or court. It is submitted that not only the cost in terms of dollars to the taxpayers that will be saved would be great, but also the human cost in terms of damage to the individuals that can be done by going through a paternity trial would be minimized.

ASSEMBLYMAN STIRLING: Yes, Mr. Chairman and members, the next witness is Hideo Nakano, representing the Public Defenders Association of California.

MR. HIDEO NAKANO: My name is Hideo Nakano, and I'm Duputy Public Defender for L. A. County and I have been asked to speak by the California Public Defenders Association. These comments are based on what I have heard in this morning's testimony by the doctors, and I have four points. The first point is I don't think they have presented a uniformity of opinion as to the results of the test, or, that is, the number of tests that is sufficient to establish a 90 percent plus competence limit in paternity. The second is, as Dr. Morris said, that each lab is allowed to determine the frequency within its local area. I don't think that is sufficient to prove paternity. The third is there is no showing that the putative father will have reliable labs which he can draw upon to dispute the findings of the labs approved by the courts.

CHAIRMAN FENTON: Wait a minute. You know that's not so, if I'm a defendant in a civil case, particularly, I can go to any lab I want and have tests taken and bring that evidence in. It's subject, I'm sure, to the same cross-examination that you would make on the plaintiff's evidence. Am I correct, or am I not?

MR. NAKANO: No, I think we're talking about indigents. There the labs that are allowed by the court are limited, and...

CHAIRMAN FENTON: How are they limited?

MR. NAKANO: Well, I think I draw back into the period of time when we were doing urine tests for opiates, and the L. A. Public Defender's lab was using a particular laboratory, which on spot checks was showing that they had a high degree of unreliability of the test results, and we were relying on those particular results with full

confidence that they were as good as the L.A.P.D. or Sheriff's or Memorial Hospital in Long Beach. So, we, from a defense posture have a greater difficulty in finding reliable labs where there are controls and they are generally shown to be not as reliable as the State's laboratories,like UCLA or...

CHAIRMAN FENTON: You wouldn't be allowed to use those?

MR. NAKANO: Well, it would be very difficult if let's say the L. A. District Attorney's Office used exclusively UCLA's laboratories for the HLA. They are the only laboratories, I think, in this area that do an HLA. We would then have to go either to the Long Beach Memorial Hospital that does HLA or go to the other two. I think there are only four or five in the state that do the HLA. One is Palo Alto, and one is San Francisco. That puts us in a peculiar position because we would be doing it after the fact. The district attorney would have its results and have utilized their laboratories, and we would be challenging the ability or the reliability as to the accuracy of that.

CHAIRMAN FENTON: You don't think the judge would sanction your going to the Long Beach one if they are using UCLA?

MR. NAKANO: I think as a practical problem it would create some problems because of transportation, costs. A lot of judges, I think, are concerned about the inconvenience to the victims, I mean the child and the mother, of sending down to places far away from the L. A. court system. I think you would have that problem if you were in a smaller county. Like what would you do if you were in an inland county and you did not have a facility close by that runs not only the seventeen ABO tests but the HLA test?

CHAIRMAN FENTON: What does the plaintiff do in this instance?

MR. NAKANO: Well, I think from my understanding of the bill that you're proposing just to use the ABO system, the seventeen blood tests that were testified to by Dr. Morris from Long Beach. My contention is that in and of itself is not sufficient to show a 90 percent probability or plus because it's not individuals specific. It depends on distribution in population,and those distributions are dependent on that particular lab that does it in that particular area. He testified to that, and I think it changes from area to area. If you were down in Compton or if you were down in Orange County,I think you would have different distributions because you have different population makeup. You have predominantly black in the Compton and Watts area, and you have predominantly Caucasians in the Orange County area.

CHAIRMAN FENTON: Let's take UCLA. Are you contending that if the plaintiff goes to UCLA that the UCLA facility is not competent enough or scientific enough?

MR. NAKANO: He may want to challenge that particular finding that he's a 98 or 97 percentile person of inclusion. I think he has that right to, and now he has to seek an appointment and the number of labs in the state is limited. I think, as indicated, I have only heard of five or six.

ASSEMBLYWOMAN MOORHEAD: Can I ask Mike Barber, I mean, if Sacramento is allowing these, you must face the situation. Can I ask how you solve that if you have somebody from a rural county in Northern California?

MR. BARBER: We're dealing with UCLA -- drawing blood in Sacramento, setting up our chain of custody in Sacramento, and flying for delivery at UCLA.

CHAIRMAN FENTON: What would an indigent defendant then do? Who would he use?

MR. BARBER: Well, there's Irwin Memorial in San Francisco to testify as a rebuttal witness. They could conceivably...

CHAIRMAN FENTON: Why don't you use them?

MR. BARBER: We feel more confortable at the time with UCLA. We since, as I have said, go to a local practitioner.

CHAIRMAN FENTON: You now have a local one?

MR. BARBER: That's correct, but we've seen blood tests flown as far back, as say, to War Memorial Blood Bank in Minneapolis, where one of the leading national experts, Dr. Polesky...

CHAIRMAN FENTON: That's where you could send it because with the county sometimes the expense is secondary. You have the funds, but what do you do with indigents?

MR. BARBER: Well, under Michael B. it's entirely possible that the public defender can make an argument that he wants a second test, and this is, by the way, the recommended method of testing the veracity of the lab. Send it to a second, independent lab. The public defender could call on Irwin, if he feels uncomfortable with UCLA (we're with our expert), call on an independent expert, one we're not dealing with, draw the blood in Sacramento, draw it in Redding. If it's delivered within forty eight hours, that blood can be tested for all the factors that are ordinarily being used.

CHAIRMAN FENTON: What you're saying, Mr. Nakano, is that you think some judges won't approve of sending samples from a particular place in a northern county down to UCLA?

MR. NAKANO: I think that that particular problem bothers me in that they're saying now that the HLA is an accepted procedure, and yet there are only five or six labs in the state, and I'll submit that California is a pretty progressive state and you have a lot of smart people around. The fact that there are only six particular institutions that can provide that kind of information leaves some doubt as to whether or not it is generally scientifically acceptable, and even if it is, whether or not this particular committee can assure through legislation that other labs will be able to duplicate with the same reliability and accuracy that these major institutions duplicate their work.

CHAIRMAN FENTON: Well, if you're going to credit them with reliability and accuracy...

MR. NAKANO: Assuming that you do.

CHAIRMAN FENTON: Oh, well, you won't do that, of course. You're going to represent your client so you can't assume that. You can only assume that if it's favorable to you, in which case you don't have a client anyhow. Right?

MR. NAKANO: (Laughter) Yes. I think that leads us to the other problem of, if we do get the lab appointments as representing indigents or people who can't afford lawyers and the fees, whether or not these things will be done confidentially. The way the particular code reads does not give us a "1017" Evidence Code confidentiality. That particular code says the court may appoint upon request of the party, but there is nothing in it that says that it will be confidential. If this were a criminal proceeding where you're trying to seek out a support payment from that putative father, I would want the confidentiality as a defense lawyer if there were a criminal action involved.

CHAIRMAN FENTON: Confidentiality of the plaintiffs?

MR. NAKANO: No, of my client, if I were seeking any second opinion.

CHAIRMAN FENTON: Why?

MR. NAKANO: Well, it's a criminal action.

CHAIRMAN FENTON: You certainly wouldn't want it in there if it wasn't going to help. You wouldn't put it in anyhow. I defended in a few criminal cases. If I go and get some expert opinions and it isn't going to help me, I don't use it. Right? Unless it's changed since I last practiced law.

MR. NAKANO: No, if you don't keep it confidential, then the expert just simply sends the second report that you've requested on behalf of the putative father to the courts. Then a copy's made and one is given to the district attorney, and one is given to you.

CHAIRMAN FENTON: Now, if you request it for your client in a civil case, they send a copy to the court?

MR. NAKANO: That's what apparently happens, according to the way the code reads. There is no confidentiality for the second report.

CHAIRMAN FENTON: I see. Is there anything else?

MR. NAKANO: Not at this time, no. Those are the major points that I thought are raised from a defense point.

CHAIRMAN FENTON: Thank you very much.

ASSEMBLYMAN STIRLING: Mr. Chairman and members, James Tucker from the American Civil Liberties Union.

MR. JAMES R. TUCKER: Mr. Chairman and members, thank you very much. I wanted to pick up on the point that Mrs. Waters was making before lunch, because I think it was a good point. During the lunch-

time an attorney came up to me and provided me with a transcript of a hearing in which Dr. Terasaki's findings of 90 percent were challenged in a jury trial. Another doctor from UCLA...

CHAIRMAN FENTON: A civil trial?

MR. TUCKER: No, this was a criminal trial. Dr. Gowdy from UCLA testified for the defense, and he went through a number of problems, many of which were the kind that Mrs. Waters touched on, that is, some of the flaws in this test. It finally ended up with the conclusion that in Los Angeles, where this particular case arose, there were at least four thousand men who were as likely to be the father as the defendant. In this case, the jury found the defendant not guilty. But, the reason I bring forth this example, is not to get into the debate of the validity of the HLA test, because I'm not an expert in that area, but I think it points out the real difficulty, the practical difficulty that the defendant is going to face in encountering these kinds of accusations where this type of test has been taken. Since AB 1981 was introduced we've argued for two points unsuccessfully. One, that if these blood test results are admitted, they should only be admitted if they indicate a very high degree of probability, and by that I would submit 98 percent, certainly more than 95 percent, and I would strongly disagree with the prosecutor's argument as they've made here today and in a number of articles they've written of 80 percent.

CHAIRMAN FENTON: What was the degree in that case?

MR. TUCKER: 98 percent.

CHAIRMAN FENTON: And, by proper cross-examination, it was brought out that even with the 98 percent degree, right, there were four thousand men that could have been the father?

MR. TUCKER: Right, and the key is the proper cross-examination. The reason that the Supreme Court in 1968 rejected the attempt of prosecutors to use probability evidence was that they went through the whole case, and they said, "Look, juries, defense attorneys, judges don't understand this kind of evidence, and we think that it's vital that if there's going to be the admissibility of this type of evidence that it be mandated that indigent defendants have the opportunity in civil and criminal cases to have an expert appointed to consult with the defense before the trial, not just to come in at the time of trial, but to help educate the defense attorney as to the complexities of this kind of issue." I think with that kind of education, they will come out with these results, but as Mr. Barber indicated, he cited a couple cases where the attorneys fold. I'm not surprised that they did fold, because I'm sure that in most of the incidences they can't make any sense out of it. What we saw this morning was probably the most dramatic example of the complexity and the difficulty of this issue. I'll bet if you took a survey of everybody who sat in here and listened to this, with the exception of the people who were up here testifying (and maybe they were also confused), I'm sure everybody else would have left this morning's session saying, "I don't know what they were talking about."

CHAIRMAN FENTON: Forgetting that for the moment, how do you answer the witness from the Sacramento D. A.'s office, that in Sacra-

mento the courts allow this evidence in? In other courts throughout the state, there are varying decisions.

MR. TUCKER: Our response all along has been if you want to admit this evidence, then set these two things. Set a sufficiently high standard, so that we would then have uniformity across the state. If the probability is higher than 95 percent or higher than 98 percent, it can be admitted. It always has to be in the discretion of the court because you may have other facts involved in the case, but in the discretion of the court. That gets you the kind of uniformity that you're talking about.

CHAIRMAN FENTON: Isn't it actually discretionary with the court, not according to what he says?

MR. TUCKER: Well, there's a dispute about that.

CHAIRMAN FENTON: Well, they admit it in some instances but I imagine not in all instances in Sacramento. I don't know. It would seem it is discretionary.

MR. TUCKER: No, because in some jurisdictions, they're saying, "We have no discretion to admit it at all, and therefore, I don't care what kind of a foundation you lay. I'm not letting it in." In other jurisdictions, they're saying, "If you persuade me through your foundational evidence that this particular evidence is sufficiently reliable that I can admit it," then the court admits it. So, in one area they believe they have the discretion and in another they believe that they have no discretion at all.

CHAIRMAN FENTON: Did you say that in Los Angeles County in certain areas that they allow it in, and certain they don't?

MR. BARBER: In San Diego County, Mr. Fenton, a case came down, a "278" criminal non-support case, came down at least a couple of years ago in which the appellate division of the superior court held that it was admissible for all purposes. The L. A. courts, to the best of my knowledge, at least in criminal cases, are not admitting it.

CHAIRMAN FENTON: I meant within the same county jurisdiction.

MR. BARBER: No, sir, I don't believe that.

CHAIRMAN FENTON: It's uniform there. That's what he's saying.

MR. BARBER: I might say that in Sacramento, in getting this in in each case, we are tested every time as to whether or not legislative intent was that it was inadmissible, every time counsel addressed that motion or made its legal argument. At least up until the last year or so, there was some debate or discussion among our judges. Apparently, they have now arrived at the conclusion that it is admissible, but there were cases though where it was admitted and rejected in the same jurisdiction.

MR. TUCKER: The point that I am trying to make is that I think that the...

CHAIRMAN FENTON: Let me ask why you haven't taken, for instance, one of the cases in Sacramento up on appeal to get a determination? You know that's the way you do it. When we have a difference in jurisdictions as to interpretation (the Lord knows what we have determined, but that's beside the point), when you have that, usually the D. A. or you, take it up on appeal.

MR. TUCKER: In some of these cases the Supreme Court has denied hearing. In the Cramer case, which was last year's decision, the Supreme Court denied a hearing in that case, so it's up to the court to decide that they want to reconcile these differences and they could, but so far they haven't. The point I'm trying to make is, I think, that besides setting that high degree of probability threshold, which I think is really crucial, the appointment of these experts on a confidential basis is extremely important. If you're going to realistically have a search for truth that pairs parties that are equal in terms of confidence and knowledge about something as complex as this -- and it's not correct what Mr. Barber said, I don't agree with Michael B., the case he was talking about which was a civil case in which the court said that you could not pre-condition the appointment of an expert on the payment of fees. The court did not say that ultimately the defendant wasn't going to have to pay these fees. They left that question open, and it's not clear at all under the present law that in a criminal case, the defendant is entitled to the appointment of experts. It was represented this morning, I think by one of the doctors that the defendants always have their right to request their own tests, and have them appointed, etcetera. That is not what the law says.

CHAIRMAN FENTON: Let me ask you a question. If you're dealing with a criminal case that has to do with psychiatrists, the D. A. uses a psychiatrist as a witness. Do you mean to tell me the court doesn't allow you or the public defender to get psychiatric experts for indigent defendants?

MR. TUCKER: It depends. It varies with the court's discretion. Now, there are certain instances in which it's mandated. If I enter a plea of not guilty by reason of insanity, the court will appoint a certain number of psychiatrists as provided by statute, but when you get into the areas, for example, let's say the district attorney is going to have an expert testify on blood that my shirt has the same blood on it that was on the murder weapon. Whether I get an expert to counter their expert, and whether I get Dr. "X," who is at the University of Chicago, who happens to be the most eminent analyst of blood in the world, or whether I get Dr. Schmoe, who runs a little clinic here in Los Angeles and does this on the side to make a little extra money, is ultimately in the discretion of the court. Now, if the parties don't have any dispute, if Mr. Stirling and the proponents of the bill agree that the defense should have this, then it's very simple to specify this in any law that's enacted, that you're entitled to these confidential appointments. I mean if their assertion is, "Well that's what the courts do, etcetera.," then my response would be, "Fine, let's put it in the statutes so it's clear to all judges, past, present, and future, that this is something that I'm entitled to as a matter of right, not something that I have to come into court and beg and plead for and hope that the judge may appoint an expert."

CHAIRMAN FENTON: You're telling me that in the case where the defendant pleads not guilty by reason of insanity, there's no

question of a psychiatrist being appointed, but in another case where the psychiatrist's testimony is very vital to the case that the D. A. presents, then it's discretionary with the court as to whether they'll allow either the public defender or private attorney, if they've appointed one, to get expert witnesses for an indigent defendant?

MR. TUCKER: Yes.

CHAIRMAN FENTON: That isn't the understanding that I have, but you should know better than I. I didn't know that.

MR. TUCKER: In many cases, I think it all goes back to the kind of showing that you were able to make, but there's always an opening for a court to deny that on a number of bases, and particularly, if you're asking for a particular expert. In this area, obviously I don't want just a local laboratory. I want somebody that can run the seventeen tests, particularly, if they are running it on me, they've gone up to twelve. Let's say the D. A. has gone through twelve or thirteen, and I say, "Wait a second, I think the next four tests are going to eliminate me." The judge can say, "Well, it's too expensive. I'm not going to order the blood be flown down to UCLA to have those four extra tests." Certainly if this is something that everyone agrees on, that the defendant should have this, then it seems to me it would be simple to put it into the statute.

ASSEMBLYMAN STIRLING: Mr. Chairman, the only comment I would make in response is that Jim Tucker indicated in the beginning that there were two proposals that they had suggested that had not been accepted. The bill was introduced on January 7th. At the hearing on March 12th, the first hearing, it was sent out to interim hearing. That's the whole purpose of this hearing, to determine what are the proposals. So I haven't rejected anything.

ASSEMBLYWOMAN WATERS: We've got to determine how much money it's going to cost, right?

ASSEMBLYMAN STIRLING: I'm sure before this bill goes to the floor, we're going to determine that. (Laughter)

MR. TUCKER: Thank you.

ASSEMBLYMAN HAYDEN: Thank you, Mr. Tucker. Mr. Stirling.

ASSEMBLYMAN STIRLING: Yes, Dawn Tilman, who is with the San Fernando Valley Neighborhood Legal Service, is the next witness.

MS. DAWN TILMAN: Let me say first of all that there's something that's disturbed me throughout this debate about the HLA, the admissibility of blood evidence and the HLA tests, and that is what I consider to be an unjustified or maybe too much concern on the part of many people for this poor man who is going to have to support this child, which may not be his, and a lack of consideration for the woman who is going to have to support this child also. In many cases, she is going to have to support it by herself. I would certainly urge the Committee, now that we do have a reliable test, not on some misplaced or excess of concern over this poor man to forget that there is another side to this story, and that we now have a way to settle some of these controversies without even going into court at all or without the long,

protracted litigation that sometimes has occurred before.

In the first place, I don't believe, and of course, I cannot testify as a witness to this since I'm an attorney who represents people who come to me who are filing or are defending paternity suits, but I don't believe that the vast majority of these suits, or these cases, ever have lawsuits filed. They're settled. The man knows that he's the father. If he's a responsible person, he decides to provide for the child. When you have a case filed, it's because one of two reasons, either the father genuinely does not believe himself to be the father or thinks that there is some real chance that he is not, or he simply doesn't want to support the child. I found that in the vast majority of cases that it's the second.

If this blood test is admissible, even at 80 percent probability, and I would urge the Committee to adopt 80 percent or above since it is reliable evidence and certainly would be in another context, most men will not even bother to contest, unless there is a very big doubt in their mind. Why should they bother to file a lawsuit or to make somebody go to the trouble of filing a lawsuit if there is very impressive evidence that they are the father? Not only would it avoid litigation altogether, but in those cases that are filed, it will make the litigation much shorter, the big issue then will be how much should this person pay for child support, not whether or not he is the father.

Remember what it is that the woman has had to face up until now, if she decides to take a recalcitrant father to court to get support she should have been getting all along. She is often subject to the most minute discussion about her sex life, and for some reason or other, nobody finds this particularly offensive. I find it offensive, especially when it's not necessary. This test provides a way around that. I think...

ASSEMBLYWOMAN WATERS: The test provides a way around that? Have you seen some of Mr. Barber's questionnaires that they use in paternity cases?

MS. TILMAN: I was just going to get to those questionnaires.

ASSEMBLYWOMAN WATERS: Well, you know, they're going to use that whether or not we're into determining whether we're going to have this kind of information as admissible. I mean it's a real concern, and I agree with you that there should be concern. It's not as if the woman is not going to be faced with that. This is not the question. The fact of the matter is, they do it now. They're going to continue to do it whether or not blood sampling is the question, and so I just want you to be aware of that.

MS. TILMAN: Right, I think that there would very quickly be a challenge to that, because...

ASSEMBLYWOMAN WATERS: There has been. I challenged it in a bill.

MS. TILMAN: Okay, but I'm talking about a challenge in court because I can't just stop them from doing it. Because if the HLA is available, and if it's used on a regular basis, what on earth is any

reason for the D. A. to want to know the intimate details of somebody's sex life? They only really need to do it now because they are going to have to worry about the evidence that they put on at the trial. There will be absolutely no need for it if a test like HLA is admissible, and perhaps only in rare cases where one of two brothers might be the possible father, but certainly they will not have any justification whatsoever for using the kind of questionnaire and putting women who are applying for welfare through what they do now.

In conclusion, I would just like to say that I can see very little reason for not having this blood test introduced, and I can see a great many reasons which I've already outlined to you for introducing it. I think that in the interest of not only saving time, saving people's feelings and being more accurate because certainly there's been no evidence that the way we've done it in the past has been accurate, that the Committee should definitely consider allowing this kind of blood test evidence to be introduced and introduced at at I would say no higher than 80 percent probability factor.

ASSEMBLYWOMAN WATERS: Mr. Chairman, I have a statement I would like to make to our witness.

ASSEMBLYMAN STIRLING: For the record, I think she said "No higher than." She meant no lower than 80 percent.

ASSEMBLYWOMAN WATERS: Excuse me, one second, I would like to address some comments to you, and this all becomes very complicated in trying to make sure that we protect people in general, males and females, and I'm very sympathetic to the kind of arguments that you raise about the chances that a woman may have to end up raising and supporting a child all by herself, and that's a real concern. As a legal services attorney, there is something that you said that strikes me a little bit strange, however, and that is that many persons who would be accused would not bother to contest it or to go into court. While we are concerned about women, we're concerned about men, we're concerned about people in the whole criminal justice system, and the whole judiciary in civil and criminal matters being able to avail themselves of our courts and all the information and resources that are necessary to exonerate them, and to prove them innocent or guilty, whatever, don't you feel a little strange when you deal with poor people, (you're servicing poor people) and you make arguments that say that they won't even bother to challenge an accusation based on blood testing that is 80 percent sure?

MS. TILMAN: Let me make myself clear, I didn't mean to imply that -- I mean I didn't mean for you to infer it the way that it perhaps sounded. What I meant was, and I think it was said in the context of I believe that in 99 percent of the cases, the man knows that he's the father of the child. He raises the issue only because he does not wish to be responsible. If this blood test was available, there would be little reason for him to raise the issue because he already knows that he's the father of the child. He simply is raising the issue so that he will not have to be responsible. I did not mean that people who genuinely did not believe themselves to be the father of the child should not raise the issue and should not be encouraged to do so.

ASSEMBLYWOMAN WATERS: Okay, if that is the fact would you

support making monies available by the state for those people who genuinely feel that they are not the father to have the resources that are necessary to be represented in court, in every way including expert witnesses, etcetera, to go along with this?

MS. TILMAN: Certainly, you're talking to a legal services attorney.

ASSEMBLYWOMAN WATERS: Well, I want to make sure.

ASSEMBLYMAN STIRLING: How about with the proviso that if upon the obtaining of their tests from their own experts it turns out to be very similar to the one prosecution of the plaintiff presented, then they shall pay to the county?

ASSEMBLYWOMAN WATERS: No, not on that proviso but perhaps on the end result of the case itself, upon the decisions made.

ASSEMBLYMAN STIRLING: That's right, in determining the allocation of cost.

ASSEMBLYWOMAN WATERS: Maybe.

ASSEMBLYMAN HAYDEN: Thank you, Ms. Tilman. Mr. Timothy J. Lee, who is an attorney at law with the San Francisco Neighborhood Legal Assistance Foundation has asked that a letter of testimony be entered into the record. The letter has been received, and it will be placed in the record accordingly, with our Secretary.[4]

The next witness, Mr. Stirling?

ASSEMBLYMAN STIRLING: Mr. John Wolfgram, who is a private attorney from Sacramento.

MR. JOHN E. WOLFGRAM: I would like to address in the course of my discussion some of the questions raised by Mr. Barber with respect to the "711" interrogatories.

I'm a private attorney practicing in Sacramento. I do defense of paternity cases. I have represented a person that wanted to be declared a father at one time and during the course of that representation, determined that as a matter of fact he shouldn't become declared the father of the child even though he believed that he may in fact, have been the father because of considerations relevant to the child. In preparing the defense of the case, there were a lot more things that are relevant than the simple question of biological paternity. The question of parenthood and the question of paternity does not either begin or end with biological paternity. They are two separate concepts. One is biological paternity. The other is legal paternity, and both of these concepts are recognized in the law. For instance, Civil Code Section 7007, I think or 7004, says something about if a woman receives artificial insemination with the consent of the husband, the biological father will not be declared the biological father. Adoption has always been a case of separation of legal paternity and biological paternity. These are the areas that I want to discuss. I think they're

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very relevant. My basic premise in starting here, and I might give a little background...

ASSEMBLYWOMAN WATERS: Excuse me, I want to warn you before you go any further, Mr. Chairman, that the conclusive presumption that a husband is the father was just taken away by Mr. Stirling in a piece of legislation so don't include that within your discussion.

MR. WOLFGRAM: No, I'll include the alternative. You offered something in the present bill which is exactly identical to what you've just taken out. Basically in undergraduate school my major was philosophy.

CHAIRMAN FENTON: I disagree with you. That was the conclusive presumption. We certainly aren't offering the same thing.

MR. WOLFGRAM: May I read to you?

CHAIRMAN FENTON: You don't have to read to me. We're talking about the bill before it was amended, okay.

MR. WOLFGRAM: Yes.

CHAIRMAN FENTON: It doesn't call for a conclusive presumption.

ASSEMBLYMAN STIRLING: You have something here that says, beginning at line 7, the first paragraph, if any party refuses to submit to such tests, the court may resolve the question of paternity against such party...

CHAIRMAN FENTON: That has nothing to do with the conclusive presumption. Give him the bill, Dave. Is he reading the right bill?

ASSEMBLYWOMAN WATERS: I'm sorry I introduced that.

ASSEMBLYMAN STIRLING: Mr. Chairman, I just might point out I did not know, did not have any idea what the nature of Mr. Wolfgram's testimony is. The only real issue that we're here to discuss today deals with the reliability and the accuracy of positive blood test identification. The philosophical issue that Mr. Wolfgram is discussing isn't really the important issue.

ASSEMBLYWOMAN WATERS: I think I'd really like to hear that, Mr. Stirling.

ASSEMBLYMAN STIRLING: I know you would, Mrs. Waters.

CHAIRMAN FENTON: I don't want to hear any philosophy. I may agree with him on the philosophy. I want to hear about this particular bill. Philosophically, I would probably agree with him.

MR. WOLFGRAM: If the matter is relevant to the determination of paternity and the legislation they do pass to determine paternity isn't relevant to the well-being of the child and it isn't relevant to the actual ultimate support, if it may not withstand the constitutional examination under due process and equal protection, then I think

the question is irrelevant. If not, I might not have anything further to say. I think there are serious questions you have come into...

CHAIRMAN FENTON: You're talking about constitutional questions? Is that what you're talking about? Now, I don't quite understand you.

MR. WOLFGRAM: Yes, there are some...

CHAIRMAN FENTON: If you want to talk about due process or constitutionality, don't bother here because we have a constitutional committee. They can take it up, you understand. You know normally how those laws are tested anyhow, and again I may agree with you, incidentally. All we're doing here is talking about the bill that Assemblyman Stirling originally proposed and the blood tests involved therein. We're not going to discuss due process because we don't determine it, and we're not going to discuss constitutionality because we don't determine it. The Legislature has passed laws that Legislative Counsel has concluded are unconstitutional. The Legislature still passed them.

MR. WOLFGRAM: My answer, Mr. Fenton, as to whether or not this legislation should be passed depends upon the system of legislation that it fits into. Scientific tests and determinations and scientific testimony, if reliable, are good to answer questions brought to court if the questions are the relevant questions. This test can very probably -- the one that's being proposed -- answer the question of biological paternity. What I'm asking you is, "Is that really the question?" and the rest of the law says it is not the question that you really want to raise. You want to raise the question of legal paternity. In other words, you want tests to determine whether or not "Joe" is the legal father, not biological father, but the legal father of the...

CHAIRMAN FENTON: They try to do it through certain tests which determine the biological father, in which case the jury determines whether they think the tests are reliable enough to indicate the legal father. I understand that's the process they go through.

MR. WOLFGRAM: Let me address the question that was addressed to the previous witness here to give you an example. This test is very intimidating, and men who know that they're the father of the child are going to, rather than take the test, admit to it. As a matter of fact, very few men know that they are the father of the child. What they are is scared that they might be. The question that usually arises is in terms of, "Yes, I remember I went out with this girl at such and such a time" and "Boy, if she's pregnant, she told me she's a virgin. I gotta be the father." So, he's relying upon what she said, or relying upon his memory, or relying upon other evidence. In other words, when the man knows that he is the father, he really doesn't know it epistemologically -- in terms of knowledge. All he does is have a belief. So now you have a powerful weapon that's going to make men fathers based upon their belief, not based upon the fact that they are, but based upon their belief that they're fathers. Unless the system that this potent weapon is going to be used in is examined, you could be making a very serious mistake in putting it off. That's basically my argument for going any further with my testimony.

I would like to address the issue to "111" interrogatories

that was raised...

CHAIRMAN FENTON: We're not going into interrogatories. What are we talking about?

MR. WOLFGRAM: Well, it's been raised here. For instance, over and over again we start with the assumption that the scientific testers have certain knowledge about the man. They have knowledge about his racial background. They have knowledge about his...

CHAIRMAN FENTON: Aren't you allowed, assuming they allow that in evidence, to ask him all those questions in court?

MR. WOLFGRAM: Not so long as the district attorney may take a "270" action. Some time in the future he's got a Fifth Amendment right not to answer those questions.

CHAIRMAN FENTON: Who has a Fifth Amendment right?

MR. WOLFGRAM: The defendant.

CHAIRMAN FENTON: We're not talking about the defendant. We're talking about the reliability of the evidence their introducing, the plaintiff's evidence. I'm not going to quarrel with you. You know, we're going in circles, you and I.

MR. WOLFGRAM: Much of the plaintiff's evidence is based upon the knowledge that the scientist has in order to put together his statistics. How does the scientist know what racial background the defendant fits into, for instance? And the fact of the matter is if an attorney does his job they don't know,if the defense counsel is doing his job.

ASSEMBLYWOMAN WATERS: That's the very point I was trying to make this morning.

CHAIRMAN FENTON: Fine, then that's a weakness in it. That's why we're holding this hearing, not for philosophy. You're telling us now what's wrong with it; that's fine.

MR. WOLFGRAM: No, what I'm attempting to do is to orient you to a different conceptual pattern, not to change your minds, but to open it to a conceptual alternative so you can then weigh what it is that you're proposing against conceptual alternatives.

CHAIRMAN FENTON: Nobody's proposing this except him. We're holding a hearing on the validity of it and the objections to what he's proposing in the bill in front of you. I can't tell you whether I favor his bill, or any other member favors the bill. That's why we're holding hearings here.

MR. WOLFGRAM: Is this the full of the bill?

ASSEMBLYMAN STIRLING: It simply allows positive blood test identification through the various tests that have been discussed today.

MR. WOLFGRAM: The problem of admitting all of the evidence

before the jury is, of course, the same problem that is here today. You have had a lot of scientific evidence presented today. The problem of the jury or the judge in that matter, consuming it and attempting to interpret it by and large rests upon the ability of the attorney to efficiently cross-examine the witnesses and to know what it is, know enough about the subject matter to articulately present his own case. The matter of HLA testing is a very sophisticated area. There is no way that I would feel confortable right now,with the limited knowledge that I have about it, attempting to defend a person in court on it.

CHAIRMAN FENTON: Neither would I, and I probably never would. That's why we get experts.

MR. WOLFGRAM: The attorney though is the one that has to decide when and where and what expert is necessary, and that's the problem. I don't mean for me to testify. I would not be comfortable in examining any of the witnesses that have testified here today.

CHAIRMAN FENTON: I've seen some attorneys in misdemeanor drunk driving cases who shouldn't have been trying them too. I want you to know that -- simple misdemeanors. What you are going to have, assuming it ever becomes law, is some people who do the same thing in drunk driving cases. We'll have experts in blood tests, just as we have in all sobriety tests. I am not talking about walking the line which any of us can analyze -- but your Breathalizer, urine test and blood test. They become experts in how to cross-examine. You'd do the same thing. You'd find certain individuals in the legal field who would be specialists in that particular thing. If you or I had a case and neither of us was a specialist, we'd bring one in. That is what we would have to do. There isn't any question. It's not what we would call one hundred percent reliable, but that's why we're doing all the questioning here.

MR. WOLFGRAM: I've had cases where, just as for instance, on the Gas Chromatograph Intoximeter used in Sacramento, where in order to prepare for a drunk driving case I spent about fifteen or eighteen hours, in order to feel that I could adequately cross-examine people as expert witnesses. I could not spend a hundred and fifty hours on this and really feel that I have mastered the area. We're talking about degrees of complexity, but what this means in terms of legislation is the length of time that it's going to take for the field of private attorneys, or public defenders, out there to become competently adept to handling this is order to present that...

CHAIRMAN FENTON: Well, once they become competently adept they don't have to spend a hundred and fifty hours each time to go over it.

MR. WOLFGRAM: Well, that's true.

CHAIRMAN FENTON: Then we have to become experts in the legal field. That's all.

MR. WOLFGRAM: But the problem is like this, and you have to get into understanding a little bit of the paternity defense system that exists out there in the real world today. It is by and large private attorneys, at least in Sacramento; the public defender's office doesn't handle them. It's only been a matter of five or six

months that a paternity defense person has had a right, an absolute right to defense counsel. Other than that, before that time, they were representing themselves in court, or if they could afford it, getting private counsel. Now they're either representing themselves or getting appointed counsel, or retaining private counsel. For the most part, most attorneys that handled paternity cases only have a few of them. They're spread out very thinly throughout the community. Most of their clients are people that can't afford a lot. Now for an attorney that has one or two, one or two cases that stretch over two years period of time, to put that investment into HLA, one hundred and fifty hours...

CHAIRMAN FENTON: That's unimportant. The important thing is the reliability of it, the percentage of reliability and trustworthiness. Assuming the majority of the Legislature and the Governor approve, it is reliable enough and the percentage is enough. Then attorneys are just going to have to go out and do it. The fact that attorneys now can't do it is unimportant. Let's just go into what's unreliable about it.

MR. WOLFGRAM: If you can't see how it fits into the system, you can't determine what's reliable or unreliable. For instance, I've got a case in which, as far as the HLA factors, the mother, the child, and the reported father have an identical HLA readout. When you compare the two factors, the child could have got factor "A" from the mother or factor"A" from the father and factor "B" from the mother or factor "B" from the father. The total readout on it is 98 some odd percent, 98.2 percent or something like that, that he's the father of the child. It just so happens that in this particular instance, the HLA factors that are involved are, according to the study done by the American Bar and American Medical Association, the most common that occur in black people, ranging up not 1 percent or something like that, but ranging up to 17 or 21 percent. They occur that frequently. Given the assumption that this guy is in fact likely to be 98.2 percent probability that he's the actual father, and given that out of this random world out there, not only are we talking about random people being the possible father, we're talking about random mating. There is also that same probability, at least it appears to me, that has to be accounted for how randomly these two people with the same identical HLA factors happen to mate. Now unless I have a sophisticated enough knowledge about HLA to begin with, I can't even begin to inquire into something like that.

CHAIRMAN FENTON: We're going in circles, and pretty soon I'm just going to have to tell you to please excuse us because we have other witnesses. You're going in circles again. You're telling me how you try the case and become an expert if it becomes law, just like you're an expert evidently in the Intoximeter and so forth. You're evidently an expert, and I'm not. You became an expert because of a certain law. You become an expert in knocking down the testimony based on either the Intoximeter, or the balloon test, whatever they use. This is what they'll do in paternity cases. I don't know of anything that's one hundred percent proof of the evidence that is brought in except in a murder case if somebody actually sees the defendant committing a murder. In these particular cases where you have psychiatry, blood tests, those types of evidence, I don't think anybody ever acknowledges that they're one hundred percent accurate.

Even though we pass the law (and I didn't vote for it), that everybody "point one 0 and above" is presumed to be under the influence, you and I both know that's not so. They aren't under the influence. One person can have a "point one five" and be sober as a judge, and somebody else can be "point 0 eight" and be drunk. Now if you tell me I'm wrong, I'll listen to you. Am I correct in that contention?

MR. WOLFGRAM: Yes.

CHAIRMAN FENTON: Well, you have the same thing in this. We're trying to determine here the degree of reliability. If the Legislature in its wisdom feels that there's enough degree of reliability to pass the law, then it will become incumbent upon attorneys who represent fathers to become experts in it, that's all.

MR. WOLFGRAM: Well, one of the things that was relevant here was the cost of this bill, if I recall. What is it going to cost to do trials or to increase trials and the need for expert testimony? Now when it becomes apparent that, as a matter of fact, we're going to have private attorneys becoming experts in this field, this narrow area, all of a sudden it looks like it's going to be more likely that there are going to be full trials on the merits. That increases the likelihood of the cost.

CHAIRMAN FENTON: Don't you charge more for drunk driving cases as an expert attorney than an average one who doesn't know how to try them and how to hit expert witnesses? Don't you charge more?

MR. WOLFGRAM: Unfortunately I generally base my fees based upon what I think the person can afford. I've spent in the paternity field an excess of six hundred hours, and I've charged a total of less than $2,500.

CHAIRMAN FENTON: No, I'm talking about drunk driving. You gave me the impression that you're an expert in that.

MR. WOLFGRAM: Same thing with drunk driving. I've handled a drunk driving case which...

CHAIRMAN FENTON: Well, normally if you can get it, you're going to charge them what the traffic will bear, you as an expert, which would be more than I could charge because I'm not an expert in the field. Isn't that the way our profession works?

MR. WOLFGRAM: Generally.

CHAIRMAN FENTON: And if an individual's indigent, normally the court is going to allow him to get good counsel, good investigation, and good experts. That's the way we've gone. Am I correct there?

ASSEMBLYMAN STIRLING: Not necessarily the best of them.

CHAIRMAN FENTON: Well, all defendants whether they're poor or not don't get the best anyhow because all attorneys aren't the best. As I say again, I'm not quarreling with you whether it's right or wrong, but we're interested here in, as Ms. Waters was trying to show

this morning, how the blood tests are not too reliable. And as I say, if the Legislature or the people who are involved feel it's not reliable, they won't pass it.

MR. WOLFGRAM: As I understand the only thing that is relevant here, and I asked this question specifically before I agreed to come down here, is whether or not the matters of policy, dedicated to answering questions of whether or not patching up the system of legislation that exists,should go forward. I asked those questions before coming here. Apparently I'm now told that these questions aren't relevant. The only question that you're asking is should this be used, should this statute pass, whether or not you look at the system...

CHAIRMAN FENTON: That is not what I said. I'll try one more time. We're here trying to determine the reliability of the tests that are involved from what has been said before. That's what you're arguing. You aren't arguing anything else. You're saying they're not reliable. You've come to a conclusion. That's what we will conclude one way or the other when we're through hearing the testimony.

MR. WOLFGRAM: I haven't said that they're not reliable. I lack information sufficient upon which to form a reliable belief.

CHAIRMAN FENTON: Well, whatever you're raising, you say there's no basis to admit them because they're not reliable, and you may be correct, and that's what we're here to determine, nothing else.

MR. WOLFGRAM: Into the system that you're trying to squeeze it, that would be my answer, yes. It's unreliable. Squeeze it into that system. As to whether or not it's reliable as being able to determine just strictly biologically, at least I think it's reliable in determining non-biological paternity, but I don't think that that's the only question that's relevant either.

ASSEMBLYMAN STIRLING: Mr. Chairman, with all due respect, the letter that did go to all the witnesses did outline four questions that would be relevant to today's discussion, and I believe that Mr. Wolfgram received that also.

MR. WOLFGRAM: Yes, and one of them relates to policy. What are the social advantages and disadvantages...

CHAIRMAN FENTON: You've given us the disadvantages. The poor guy isn't going to afford to get expert testimony that he needs to upset the expert testimony brought in. That's the social policy that you argue. It's going to be too costly for defendants who may not get the court to allow them to get good expert testimony. They may not be able to afford it, not being able to have the court give it to them. Isn't that what your saying. That's the social policy. That's what you said.

MR. WOLFGRAM: That's one of them, but there is much more. As, for instance, expertise develops in paternity defense and it becomes a narrow field of expertise, the more basic and fundamental questions are going to be more quickly presented to the courts. If

you had a thousand attorneys around California that really knew about paternity defense, and really put time into it, the questions that you would be asking here would be completely different because there would have been all kinds of different decisions that have been passed on. But now you're getting to the stage where in fact there are going to be experts developing out there and they're going to challenge the whole litigation scheme that you have,including this.

CHAIRMAN FENTON: That's nothing unusual in the legislation field. Legislation is challenged on the grounds of due process and constitionality all the time. It's nothing new. It's our system. Nobody said that the Legislature is so solemn and wise in its judgment that everything that it passes is sacrosanct and can't be questioned. We do it all the time.

Anything else you'd like to add? I know you feel I've been arbitrary, and perhaps I have. But I've been with all the witnesses because all we wanted here was relevant testimony. You've given us the social disadvantagees, and I think you may very well be right. I don't know. But there was one time (it's probably before your time, I having practiced a little longer than you) where no defendant was even entitled to legal representation at all except, I think, in murder cases and some felony cases. They represented themselves.

MR. WOLFGRAM: I understand that.

CHAIRMAN FENTON: Then the whole system was changed. The whole social system has changed, and this system may very well do that.

MR. WOLFGRAM: I hadn't realized that one exists, but my basic argument has been put forward in a law review commentary.

CHAIRMAN FENTON: We'll be happy to put it in the record [9 Valparaiso University Law Review 243].

MR. WOLFGRAM: As further consideration,I'd like to make as part of the record and for your consideration in the area of paternity and parenthood, even welfare legislation, a cross-complaint which I'll be filing which raises a lot of positions and, I think, some of the questions that...

CHAIRMAN FENTON: I don't know. We'll look that one over. We're not interested in enhancing the reputation of any attorney in particular. If it bears on this, we'll make it part of the record, but I can't tell you at this moment. We'll have to look it over.

MR. WOLFGRAM: You can cross my name off it.

CHAIRMAN FENTON: No, that has nothing to do with it in particular, but we'll look it over and make the determination.

MR. WOLFGRAM: Prepared by another attorney in that similar case is a points and authority which, although the work is independent from mine, it is...

CHAIRMAN FENTON: Points and authority on what?

MR. WOLFGRAM: On the right of the defendant to litigate the question of legal paternity as opposed to biological paternity.

CHAIRMAN FENTON: I don't think we're discussing that in this hearing. We're not arguing that. We're just determining whether certain tests should be permitted into evidence in paternity suits.

MR. WOLFGRAM: The only reason that I put it in the record is so that you as legislators can peruse it and examine the different concepts...

CHAIRMAN FENTON: I would suggest that you keep track next year of what goes on with this particular legislation. When it comes up, you can do two things. You can appear before the committee when the bill is heard. You can send copies of what you want to do to every member of the Judiciary Committee, and if it passes out, you can send it to every member of the Assembly if that's where it starts and the same way for the Senate. There's nothing that prevents you from doing that.

I've given you a lot of time. You and I have been arguing this case. We've got about four more witnesses, and we have to constrain the time on it. If you have something different that you want to give us, you go right ahead. Thank you.

MR. WOLFGRAM: Thank you.

ASSEMBLYMAN STIRLING: Gerald Silver and James Cook, representing the United Fathers Organization.

CHAIRMAN FENTON: I've seen you before.

MR. GERALD SILVER: Right. Senate Bill 1351, mandatory wage assignment. (Laughter) Thank you for allowing us this opportunity to...

CHAIRMAN FENTON: Identify yourself because there are two of you.

ASSEMBLYMAN STIRLING: ...at the joint custody hearing.

MR. SILVER: ...and at the joint custody hearing. I'm President of the San Fernando Valley Chapter of the United Fathers Organization.

CHAIRMAN FENTON: You still haven't identified yourself.

MR. SILVER: Dr. Jerry Silver.

CHAIRMAN FENTON: Now your going, okay.

MR. SILVER: ...and to my right is Jim Cook, who is on the Board of Directors of the United Fathers Organization. I'll try to be brief. I'm not a doctor, and I'm not an attorney; you're obviously dealing with both medical and technical information. I would like to rather briefly though present the father's viewpoint in this. The first point I'd like to make is that fathers don't mind supporting

their children. We want to support our children. We look forward to that, but we don't want to support someone else's children. Fathers no more want to be in the position of paying someone else's traffic ticket than what isn't their own responsibility. Things that concern us about this bill -- first, I'd like to comment that we are pleased that AB 1981 is in fact moving ahead. I think it's a step in the right direction when the Assembly is willing to take a serious look at rebuttable presumption. We think that concept is long overdue. However, the Committee has to look very closely at what kind of information or evidence is in fact presented. We look askance at any test which perhaps may show only 80 percent reliability.

CHAIRMAN FENTON: What percentage reliability would you say was okay? Other than 100 percent.

MR. SILVER: I would buy 98 percent or some number close to that. One, we think every male ought to have a right to this test, that it ought to be something that's there and that's available if he's accused of paternity. Putative father and child support matters are involved so he should have a right to this test. It would be the highest quality test possibly attainable and that it not be the only test used, that rather, if a jury or other evidence or information is available that that be brought in.

CHAIRMAN FENTON: Such as?

MR. SILVER: Such as witnesses or proof or...

CHAIRMAN FENTON: That's already permitted.

MR. SILVER: Right, of course.

ASSEMBLYMAN STIRLING: It very seldom happens though. (Laughter)

MR. SILVER: I agree.

CHAIRMAN FENTON: He means witnesses will say that at that time the defendant wasn't there, I presume.

MR. SILVER: Second, that the cost of such tests be underwritten by the county or the state in general. We feel that's important...

CHAIRMAN FENTON: Wait a minute. You just said that you don't like to spend money for other fathers for their children, and neither do I.

MR. SILVER: Agreed.

CHAIRMAN FENTON: But by the same token, neither do I want to spend money for somebody who is charged either civilly or criminally and who can afford to pay for the tests. Neither do I want to pay that.

MR. SILVER: That's correct. However, the state does pay for trials, for court proceedings in order to prove beyond reasonable doubt that there is a responsibility...

CHAIRMAN FENTON: Well, I was involved in the legislation that, with there being more delinquent fathers, adds a little on to help pay that cost. You may not believe it, but there are the fathers who don't support their children. There are quite a few of those too.

MR. SILVER: Speaking generally, we feel that in these matters the male should have legal representation or medical representation or expert witnesses available. We feel that he should have a right to an attorney when paternity is challenged or is an issue. Now particularly we cite the Castro/Ventura situation [93 Cal. App. 3d 462 (1979)] where some eighty thousand men throughout the state of California were intimidated or literally coerced into saying, "Yes, I was a father," because of the threat that the district attorney that they would be brought in for a legal case. As a result many fathers simply sat and signed...

CHAIRMAN FENTON: You're referring to...

MR. SILVER: No, no. This was a child support case.

CHAIRMAN FENTON: No, I know, but for failure to provide. Isn't criminal proceedings what you're talking about?

MR. SILVER: That's right.

CHAIRMAN FENTON: Yes, that's what I said.

MR. SILVER: Out of fear, twenty-one year olds. They weren't sure. They're not knowledgeable. They don't have the sophistication that Mr. Barber and his people have. Hence, they sign this, and it wasn't until maybe a year or so later that they became aware that really their rights had been trod upon. We think that there cannot be any compromising with expediency and justice. If we are to provide justice, we cannot at the same time work expediently, that is to say,to work to clear large backlogs of cases. Mr. Barber referred to some twenty-two thousand cases of paternity pending. Well, you know, those fathers still have a right to due and reasonable process. We think that it's time that fathers receive...

CHAIRMAN FENTON: Excuse me, where's Mike Barber? Is he here? Are there twenty-two thousand pending?

MR. BARBER: That's what counsel from the state welfare department tells me.

CHAIRMAN FENTON: Now that's paternity, not failure to provide?

(UNKNOWN): Those are paternity cases referred to the district attorney.

CHAIRMAN FENTON: Paternity cases.

MR. SILVER: You don't want to open the flood gates here, but the point is there are obviously a lot of these cases. I don't think we ought to compromise justice just because of the numbers. Finally, I think what is needed is -- and we appreciate that the Assembly is now beginning to look at fathers' needs, beginning to look at

men as individuals, and beginning to bring some fairness and equality to things. We would like to compliment your support in the joint custody law, and we think now your willingness to take a look at the rebuttable presumption is a step in the right direction. Those were my remarks. Jim Cook perhaps would like to follow up.

CHAIRMAN FENTON: Give us something different?

MR. JAMES A. COOK: I will quickly cover a couple of other items. I'm James A. Cook. In addition to the United Fathers Organization, I also...

CHAIRMAN FENTON: How do you support it? Do you have annual dues or something?

MR. SILVER: Twenty-four dollars a year. Are you thinking of joining?

CHAIRMAN FENTON: No,...

MR. SILVER: You'll enjoy the newsletter. You know we sent Alan Robbins an application last week.

CHAIRMAN FENTON: My youngest child is in the twenties. I don't think I need to join at this time. I don't think I have the problem. I never had the problem, fortunately. I was just curious. How many members do you have?

MR. SILVER: We have several chapters throughout Southern California expanding nationally, hundreds of members, including many women, second wives, who have become extremely concerned. Now they have this new man in their life, and they see the treatment these fathers have received at the hands of courts, and so on.

CHAIRMAN FENTON: You're concerned with custody as well as child support and so forth.

MR. COOK: Yes. Custody, child support. Particularly we want to see a strong emphasis on joint physical and legal custody. We think that's very important in the State's moving ahead.

CHAIRMAN FENTON: I didn't mean to interrupt you. I was just curious. Go ahead. I'm sorry.

MR. COOK: That's all right. As I mentioned, I'm James Cook, and in addition to the United Fathers Organization, I also serve as a liaison with a number of such organizations nationwide, particularly on custody issues. I'll say a couple of things very briefly. I appreciate, as all those that I represent appreciate, the intensity with which more certainty has gone into scientific analysis of paternity, and I hope that this shall continue, to take it of the realm of conjecture or probability, more into a realm of absolute certainty. Another point that I would like to make relative to this is a street phrase, which I'm sure many of you have heard, but it's indicative of the times. As I recall it goes something like this: "Sex is fun, babies are cute, pills are dangerous, and babies mean money, so what's the big deal?" The effect is that the frequent subsequent step after

after having the baby is this business that it can be used as a source of income, and for that reason I think that we have to be very certain and very careful as to who carries that burden financially.

CHAIRMAN FENTON: I would imagine that with twenty-two thousand cases most of them are by virtue of welfare. I imagine the woman goes in and asks for welfare, and then they ask who the father is and they go from there. I could be wrong, and Mr. Barber can correct me. I think if they prove paternity, the amount that's collected for child support goes into the county to offset the welfare anyhow? Isn't that what happens?

MR. SILVER: Yes, that's one of our considerations. It becomes again an economic issue rather than the emotional relationship of a father to his children. That's one of the problems we're having with this whole visitation situation...

CHAIRMAN FENTON: Well, forget the visitation. You will agree that the father, whether married or not married, should support the child. You have no quarrels about that, do you?

MR. SILVER: No, absolutely. We completely agree with that.

CHAIRMAN FENTON: All right.

MR. COOK: Let me proceed by answering two of the...

MR. SILVER: Let me add to that -- pardon me if I may,Jim -- that isn't to say though that the woman is not also equally responsible, that is to suggest that in cases of divorce the financial responsibility ought not shunt only to the male, that certainly fathers should be in front of the eyes of the law legally responsible for the financial side of the children's welfare, but so should the woman.

CHAIRMAN FENTON: I'm a chauvinist. I believe that the woman should bring up the child and the father should support her and the child during certain periods of time. Somebody may disagree, but that's my old fashioned feeling. And you support your child, and I'll support mine.

MR. SILVER: Agreed, but...

ASSEMBLYWOMAN WATERS: Let me ask you...

CHAIRMAN FENTON: Maxine,...

ASSEMBLYWOMAN WATERS: Mr. Chairman, I'm not going to get into this, and I'm not even going to make any comments about the feeling that some people have babies to collect money. I'm just not going to deal with this today because I'm tired and I don't have enough time to beat up on this guy about that. Let me just say to you, "Let's confine this witness the way you did the last one so we can get out of here."

CHAIRMAN FENTON: Right, please confine your testimony just to the tests.

MR. COOK: You asked two questions. I would like to take two of the questions that have been submitted relative to this hearing. If the blood test results show only a probability of paternity, the evidence is inadmissible. Should this restriction in Section 895 be removed? No, the restriction should not be removed. And the follow-on question. Should section 895 be amended to conform with case law admitting use of HLA tests? Yes, I think we should bring that in more widely, and let me conclude by two points which are rather public, political problems if one is going to go ahead with such legislation. I think the variables that are dependent on ethnic gackground or ethnic mix foretell trouble for this sort of legislation, and I think you should expect it. Furthermore, an issue so much in isolation, and by that I mean dealing solely with identification in paternity, and not also allowing other related questions, such as access to the child by the father once paternity is proven and so on, will have to be addressed in this type of legislation.

CHAIRMAN FENTON: Well, I thought that the law now says that in paternity suits, whether the father is married or unmarried, once it's determined he's the father and has support he has the right to certain visitation and custody. Am I incorrect? Mr. Barber, can you tell me? I hate to digress, but I think that on that we should. I thought something would come up on that.

MR. BARBER: Yes, I think I can clarify it. It's not quite as clear-cut as you stated, Mr. Fenton. If the father has never taken the child into his home, there is no presumption or if the child has never been born out of wedlock or conceived during wedlock, there is no presumption of a custodial right. He must ask the courts for it. However, if he is a presumed father, either conclusively or rebuttably, he does, even if he was never married but did take the child into his home, then he does have a presumptive right of custody. As to visitation, there is, if he prays for it, a clear right to visitation on the same basis as if he were married to the mother.

CHAIRMAN FENTON: That was my question.

ASSEMBLYWOMAN WATERS: That is correct.

MR. SILVER: I want to hasten to add we don't like the use of the word visitation in any discussion of this sort. We don't think that the children should visit either their father or their mother. I think it's essential that there be an ongoing relationship with both parents after divorce or if a divorce has never taken place. This visiting status is something I think that must be addressed.

CHAIRMAN FENTON: Are you talking about people who are married or unmarried?

MR. SILVER: It doesn't really matter. The point is that children shouldn't visit either parent. There should be an ongoing relationship, a close, caring relationship, and the way the current law has been constituted in the past, that the children move to one side and they become the spoils of war and the other parent, as you just pointed out, was granted or legally given visitation rights. Fathers don't find that acceptable and more often than not now women are beginning to recognize that visitation erodes the relationship with the children. Thank you.

CHAIRMAN FENTON: Ms. Waters.

ASSEMBLYWOMAN WATERS: You put it rather simplistically, in terms of the visitation rights. There are a couple of things going on, I believe, in terms of people coming to a different understanding about the relationship between parents and their children. One, women are recognizing that we should let you have them more and that you should take care of them more. We're prepared to let you have some long-term visitation rights beyond the two weeks that you have normally been accustomed to. By the same token, there are men who are willing to accept more responsibility, so I don't think that it's either one way or the other. It's kind of we're all moving to that point.

MR. SILVER: Yes, we are, and I think that's constructive for both sides, though I do have to say that the Garcia bill, which is up before the Legislature this year, was a concern to us, where the idea that the financial side of the relationship, paying child support, is completely separate from visitation and custody.

ASSEMBLYWOMAN WATERS: Well, that's another argument all together. To tie visitation to child support payments is a whole other argument, and I think the courts need to be left with discretion about certain attitudes and actions on the part of either parents that would preclude them from being involved at all.

MR. SILVER: I would agree. But I think we're certainly...

CHAIRMAN FENTON: Permeating the law is still what's for the best interest of the child, not what's best for the father, and not what's best for the mother.

MR. SILVER: Agreed, and I think clearly its access, continuing access to both parents.

CHAIRMAN FENTON: Not necessarily.

ASSEMBLYWOMAN WATERS: It's not clear.

ASSEMBLYMAN STIRLING: With all due respect,...

MR. SILVER: I guess, Jack, you ought to take it up with your wife from here. (Laughter)

CHAIRMAN FENTON: Thank you very much, gentlemen.

ASSEMBLYMAN STIRLING: The final witness at this point is Connolly Oyler, representing the Family Law Section of the State Bar.

CHAIRMAN FENTON: No, I don't think so.

ASSEMBLYMAN STIRLING: Is he here? The State Bar has filed a letter with me indicating their general support of the concept of the bill.

CHAIRMAN FENTON: Okay. We still have a little time. Is there anyone else here who would like to be heard? Come forward please. State your name...

MR. LEE M. JACOBSON: My name is Lee Jacobson. I have submitted to all the members of the Committee a copy of a law review article of which I am a co-author, which just appeared in the University of Santa Clara Law Review, dealing with paternity testing with the HLA system.

CHAIRMAN FENTON: We'll make that a part of the record too.[5]

MR. JACOBSON: You should all have copies. If not, and you would like them, please...

CHAIRMAN FENTON: We'll handle it.

MR. JACOBSON: I'm going to be very, very brief. I think Professor Peterson this morning touched on many of the same feelings that I have toward the test. I want to make a couple of things clear. I think perhaps one of the biggest problems facing the legal profession in dealing with this test is the fact, as was mentioned before, little is known about it by attorneys. I think there are a couple of flaws within the test that need to be brought out before any legislation is changed which would now allow its admissibility into court in an affirmative way.

I think one of the biggest things we have to be reminded of is the fact that the HLA test presumes that there has been intercourse between the mother and putative father on at least one occasion. If you are not willing to accept this presumption, the test is worthless. It means nothing. The problem with the test is that without this presumption we're going to have a situation where high percent probability paternity figures are going to be introduced into the courtroom which will be absolutely meaningless. If I can phrase a hypothetical...

CHAIRMAN FENTON: Well, aren't you as a matter of practicality going to have plaintiff saying, "We had intercourse" in some instances and, now let me finish, the defendant denying it.

MR. JACOBSON: No question.

CHAIRMAN FENTON: Now, tests or no tests, if the trier of fact believes the defendant as opposed to the plaintiff, that's it, isn't it?

MR. JACOBSON: Well, what I'm proposing is this, and in my article the conclusion that I and my co-author reach is that the HLA evidence isn't that good an evidence but it's probably too valuable to be completely ignored. However, if you are going to be using it in an affirmative way in the courtrooms of California, it should only be used with certain procedural safeguards attached. One which Professor Peterson touched on a bit that I want to emphasize is to have some sort of preliminary finding that there indeed has been sexual intercourse between the mother and putative father on at least one occasion.

ASSEMBLYWOMAN WATERS: That's very interesting.

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5 Appendix E

CHAIRMAN FENTON: Well, let me ask you another question. The judge is sitting there, and he hears certain testimony. He concludes that from this there was not access, he will then direct the verdict at that point. You won't even get into the testing, will you?

MR. JACOBSON: This is very important. I think...

CHAIRMAN FENTON: Is that true?

MR. JACOBSON: In so far as I see now,...

ASSEMBLYWOMAN WATERS: It depends on the bill.

MR. JACOBSON: In so far as I see things now, the test is admissible under Cramer v. Morrison without regard to whether or not there was a preliminary finding of sexual intercourse. Therefore you're getting into a boot-strapping argument, and what you're going to have is jurors who are often impressed by this aura of credibility that is generated by scientific evidence using the percent probability of paternity figure to make a finding of intercourse that's not true.

I think the other fundamental flaw of the HLA test is that it does not take into consideration certain mitigating factors which would upset the basic equation of having intercourse result in pregnancy. You'll find through examination of my article what we have done is set up a hypothetical in which by a chance we have a woman sleeping with two men who have the same blood antigen makeup. What we have done, is we have painted man "A" to have with him the following traits: (a) she slept with him on numerous occasions, let's say twenty, (b) no birth control methods were used at all when these two engaged in sexual intercourse, (c) the man had, let's say, an average male sperm count, and (d) intercourse occurred during a frequency of high fertility during the woman's cycle. Man "B," on the other hand, he has intercourse with her on one occasion. Both she and the putative father use reliable methods of birth control. The man is found to have a lower sperm count, and the time sexual intercourse occurred was during a period of low fertility in the woman's cycle. The HLA test will not, and I have to emphasize this, will not show differences between man "A" and man "B." They will both score the same. Why? Because their blood antigen makeup is the same. Yet...

CHAIRMAN FENTON: Well, we don't intend to make the test conclusive. Do you intend to admit it and with other evidence, and allow the jury, with the other evidence, to make its consideration? You as a defense attorney can argue the points that you're now bringing up as to the probability because of all these incidents with "B," for instance, that regardless of this, the probabilities, you know there's a factor of 2 percent who couldn't be the father, and that all these things that you're bringing up should lead you to believe that this is one of the individuals who falls within the 2 or 3 percent. Isn't that the argument that you would normally give?

MR. JACOBSON: There's no question about it, and the basic fear that I think we are all addressing here today, and it's been oft stated by numerous authors and commentators who have been interested in the paternity area, is that the paternity action is going to become nothing more than a trial of the blood. I do not wish to see

that happen, and in formulating legislation, if you are going to amend section 895, I would like to see some safeguards, such as have been mentioned by myself and Dr. Peterson which would allay that fear. We would not have the paternity action becoming nothing more than a trial of the blood where in essence the only thing that would happen would be the HLA test would be admitted in on the basis of that finding along...

CHAIRMAN FENTON: No, I can see your argument about having a finding on intercourse. I can understand that determination, but regarding the fact that both "A" and "B" had intercourse there's still only the probability of paternity. That argument, I would say is for the defense attorney to make. The lawyer has to be competent enough to argue that in consideration of the tests.

MR. JACOBSON: I wholeheartedly agree with you. The basic fear that I have though is when you have twelve lay jurors sitting in that box, or even a judge for that matter in a court trial, when you have and as you will have as the HLA system expands and more and more antigens become discovered, percent probability of paternity figures in inclusionary cases always resulting in 99 if not at some time 99.99 percent probability of paternity. How important will these other corroborative factors be? I would like to see through some of the ideas that have been expressed here today, i.e., such as a minimum level percentile paternity figure. I'm in favor of something again 95 percent or 98 percent. I don't agree with the 80 percent figure.

CHAIRMAN FENTON: Now, that part I don't understand. I thought you were arguing that once you get your figure, you first determine by all these facts whether the jury thinks he could be the father, then you allow the rest of it in. That's what I thought you were saying.

MR. JACOBSON: Well, I...

CHAIRMAN FENTON: I agree with you. A high percent probability, 95 or something should be set. That I have no quarrel with. Assuming we have 95 percent, or let's say 98 percent for sake of discussion, you're not advocating that first you should try the party with a 98 percent probability in there, are you?

MR. JACOBSON: No, no. I think as...

CHAIRMAN FENTON: Once you've determined...

MR. JACOBSON: I think, as Dr. Peterson said earlier, if you cross the preponderance of the evidence threshhold that indeed there is more likelihood than not that at least on one occasion there has been intercourse between the mother and the putative father, then, and only then, you allow in evidence of the HLA testing. If not, you're getting into the boot-strapping argument. I have formulated within the law review article and would like to offer it for your consideration a proposed model jury instruction, which may be used in conjunction with any legislation you enact.

CHAIRMAN FENTON: Well, your whole article will be part of the record.

MR. JACOBSON: I appreciate it. That's all I have to say.

CHAIRMAN FENTON: What year are you in?

MR. JACOBSON: I'm a Juris Doctor, and I'm awaiting Bar results right now.

CHAIRMAN FENTON: Are you?

ASSEMBLYMAN STIRLING: We all know what that feels like.

CHAIRMAN FENTON: Yes, we've been through that. Thank you very much. Good luck to you.

MR. JACOBSON: Thank you very much.

CHAIRMAN FENTON: Anybody else? We want to thank you all very much. David, you want to make a simple conclusion...

ASSEMBLYMAN STIRLING: I just want to thank the members of the Committee for their patience. Thank you, Maxine, and Dick for coming down south, and all the witnesses and all the participants here today. I think it was a good hearing, and I appreciate having it held.

CHAIRMAN FENTON: Thank you all.

# # # # # #

APPENDIX A

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THE UNIVERSITY OF SANTA CLARA • CALIFORNIA • 95053

SCHOOL OF LAW

February 5, 1980

Assemblyman Dave Stirling
California Legislature
State Capitol
Sacramento, California 95814

Re: AB 1981

Dear Assemblyman Stirling:

Thank you for calling and telling me that AB 1981 is coming up for hearing. I am writing to express some reservations about your AB No. 1981, which is designed to insure the admissibility of probability calculations based on blood typing in paternity cases. I agree that these calculations should be admissible, but I am concerned about several things.

First, on a technical level, the bill suffers from an ambiguity. The Court of Appeal allowed in HLA test results on the grounds that they were tissue tests, not blood tests. This is nonsense, but if it is the view of the Court of Appeal, then the bill as drafted would have no effect on the admissibility of HLA test results because they are not "blood" tests. The bill should be amended to include reference to both red and white blood cell tests.

My second concern is more fundamental -- judges, juries and attorneys neither understand the significance of the statistical calculations nor know how to use them. As the California Supreme Court stated in People v. Collins, 68 Cal.2d 319, 66 Cal. Rptr. 497, 438 P.2d 33 (1968), "Mathematics, a veritable sorcerer in our computerized society, while assisting the trier of fact in a search for truth, must not cast a spell over him." The Court counseled caution in criminal cases, but equal caution should be employed in paternity cases as it is important for the child that a correct finding be made.

The critical portion of the typical report received from the Paternity Evaluation laboratory at UCLA reads as follows:

> The probability of paternity for _____ as the father of _____ is 97.8%.
>
> The probability of paternity is calculated by comparing (A) the probability that a mating

> of a random male in the population (same race as the putative father) with a female of the mother's phenotype would produce an offspring of the child's phenotype, and (B) the probability that a mating of a male of the putative father's phenotype with a female of the mother's phenotype would produce such an offspring.

This is commonly misunderstood to mean that the probability of the defendant's paternity is 97.8%. This is an error. This calculation is based on Bayes Theorem, which tells one how to modify a previously established probability when new information (i.e., the blood tests) is supplied. In order to do this calculation one must assume a previous probability that the defendant is the father and then ask "how do the blood tests modify this probability?" Thus, in order to do this calculation the paternity laboratory assumes (1) that the defendant had intercourse with the mother and (2) that, in terms of timing, fertility, and frequency of coition, the defendant is equally likely to have fathered the child as the "random male" referred to in the report. Thus, these calculations begin with the astonishing assumption that the defendant is already 50% likely to be the father!

Since this assumption is not commonly understood, the trier of fact is never made aware of it. Even if counsel does understand it, it can take an extremely skillful cross-examination of the witness from UCLA to extract it in a form that the jury can understand. And since Dr. Terasaki seldom testifies, one of his assistants may testify and there is no guarantee that that person will be sufficiently grounded in the application of Bayes Theorum to respond to questions designed to expose these assumptions.

My third concern is that the probability is presented to the jury in a form which makes it impossible, even assuming understanding of the underlying assumptions, for the jury to integrate the significance of the calculation with the other circumstantial evidence in the case. For example, assume that the circumstantial evidence showed that X, with whom the mother had been having a sustained relation, was five times more likely to have fathered the child than the defendant. The jury is in no position to integrate this fact into the probability calculation.

Finally, I am concerned that the Nordic countries, which have been using blood tests to calculate the probability of paternity since 1958, do not consider that they have a sufficient probability of paternity to render an opinion unless they get a result of 95% or higher. I am not well

enough grounded in statistics to understand exactly why 95% is considered so significant, but the fact that countries with such vast experience with the area use the 95% rule makes me very concerned about that fact that we do not.

Suggestions:

1. The bill should be amended to require that the jury be instructed in substance as follows:

> Based on the blood tests, Mr. _____'s probability of paternity may be calculated if certain assumptions are made. These assumptions are that Mr. _____ has had intercourse with the mother and that one random man from Mr. _____'s racial group has also had intercourse with her. It is also assumed that both of these two men had equal chances of becoming the father of the child with respect to the frequency of intercourse, fertility, use of contraception, and the like. It is important to remember that this calculation cannot be used to prove that Mr. _____ had intercourse with the plaintiff. Based on the other evidence in the case you must first conclude that Mr. _____ had intercourse with the plaintiff before considering this calculation. If you believe, based on the other evidence in the case, that intercourse has not been proven, then you must disregard this calculation and find for Mr. _____.

There is precedent for this kind of instruction. Evidence Code § 403 states that where the relevance of proferred evidence depends on the existence of a preliminary fact the judge "may, and on request shall, instruct the jury to determine whether the preliminary fact exists and to disregard the proferred evidence unless the jury finds that the preliminary fact does exist."

Unfortunately, without legislative imprimatur, a judge is unlikely to feel confident enough about the statistical basis of the evidence to give such an instruction. It should, therefore, be included in the statute. See Evidence Code § 646 where this has been done with respect to jury instructions on res ipsa loquitur.

2. The evidence should be presented in a way which facilitates the integration of circumstantial evidence into the genetic probabilities. In Sweden calculations are done based on what is called a "paternity index"(L). The probability of paternity is simply the paternity index of the defendant divided by the sum of the paternity indexes of all of the potential fathers. The index is set up in such a way that the

index of the random man is always 1. Since the calculation assumes there is one other random man equally likely to have fathered the child, 1 is added to the denominator. Thus, if the defendant had a paternity index of 19, then his probability of paternity would be

$$\frac{L_D}{L_D + L_X} = \frac{19}{19 + 1} = \frac{19}{20} = 95\%$$

The beauty of this formula is that if other circumstantial evidence shows that one is five times more likely than another to have fathered the child, then the effect on the calculation may be readily seen by multiplying that person's index by 5 wherever it appears in the equation. Thus, if X were five times more likely to be the father, then you get

$$\frac{19}{19 + 5} = \frac{19}{24} = 79\%$$

If D is five times more likely to be the father you get

$$\frac{95}{95 + 1} = \frac{95}{96} = 98.96\%$$

Expressing the probability by this formula has the advantage of giving the Bar a standardized formula to which attorneys may become accustomed, and it gives the jury an opportunity to rationally evaluate the probability calculation in the light of other evidence. I would suggest, therefore, that your bill be amended to require that the probability be expressed in this or an equivalent form.

I understand that this bill is coming up for hearing on February 27. If you think any testimony would be helpful, I would be glad to attend and testify or to help in any other way.

Sincerely yours,

Robert W. Peterson
Professor of Law

RWP:jb

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Dr J Valentin

UNIVERSITY OF GOTHENBURG
DEPARTMENT OF GENETICS

APPENDIX A

1979-07-25

Prf R W Peterson
The University of Santa Clara
School of Law
Santa Clara, Calif 95053, U S A

Dear Bob,

Thanks for letter 1979-01-26 which I am sorry to have kept for so long without answering.

I believe and hope that it is an exaggeration to state that paternity tests in California are done exclusively by HLA, although HLA presumably enters as an early measure in most cases.

HLA is undoubtedly a very good and important system, and Terasaki is absolutely one of the foremost experts in the world on this system. The latter fact tends to obscure his own views of its reliability. As he states in the paper you've sent (J Family Law 16[77/78]:543-557) some have pointed out that the reproducibility and reliability of HLA results is not quite comparable to that of other systems. He also mentions his own publications on the reliability of his own tests, performed thus by the best tester in the world, and his results are of course remarkably good (though the figures he mention still correspond to a slightly higher error rate than that of ABO or Rh for instance). But others may not always be quite as good as he is at it. Some three years ago the German HCW declared that the reliability of a single HLA exclusion should be regarded a s having a 95 % reliability in courts (I can find the reference for you if necessary, but haven't got it here). This does not mean that HLA is no good for paternity, it means that tests solely based on HLA would be a bit risky.

You mention that you find his explanations of the statistical tests a bit sketchy and I agree, but as far as I can see they're not erroneous. It's a pity that he doesn't give the exact formula used in a computation somewhere because many use a simplified formula which in unfortunate circumstances may lead to grossly misleading results. I have a paper on this under review but at present it may suffice to say that the possibility of recombination must be taken into account. See e g Terasaki's Table 2 in the paper we're talking about; the putative father in the first line has a presumed haplotype composition 11.27/2.7. According to data available to me the frequency of this constitution in the U S is 2x.002x.039 = .000156 . Unless recombination is taken into account half of his sperm are correct in the case described, while the frequency over all of correct sperm is .002 so the frequency o f this type of man among true fathers would be .000156/(2x.002) = .039 . The frequency of men with this phenotype in the population however is composed of the .000156 men with the above haplotypes, but also those with the

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alternative haplotype configuration 11.//2.27, which cannot be distinguished from 11.27/2.7. The alternative configuration occurs with a frequency of 2x.002x.024=.000096. Therefore the sum frequency of men with this phenotype in the population is .000156 + .000096 = .000252 . The Paternity Index (frequency of men with this phenotype among fathers, divided by same frequency among random men) turns out as .039/.000252 = 154.76 corresponding to a Bayesian probability of paternity of 154.76/155.76 = 99.4 % (Terasaki obtains 99.2 %, presumably by using slightly different haplotype frequencies).

If recombination is taken into account, about 1 % of the 11.27 sperm from 11.27/2.7 men are converted into 11.7 or 2.27 and should be deducted from the numerator. Furthermore, about 1 % of the sperm from 11.7/2.27 men are converted into 11.27 . Correct computation thus goes like this:

$$\frac{(.99x.002x.039 + .01x.002x.024)/.002}{.000252} = 154.16$$

Obviously correct and simplified computation give the same results in this case and there is no possibility (or need) to know whether Terasaki does the correct thing, here. In some cases you may convert a 99.9 % probability into a .1 %, or the other way around!

Of course, this is just a technicality, even if it is of great importance to some particular cases.

HLA is impractical for mailed samples, particularly if the influx of samples for a given day is unknown. At present we test say 10-20 samples a week , which is quite OK with our present staff, on HLA. Since we are a national lab this means we've had to build up an organization with some 15 sampling stations over the country with which we have personal contact so that we can steer the influx. As a comparison, we get on the average 30 samples a day for conventional tests and are easily adaptable to influx variations from 10 to 60. If clients have to appear personally at tester's lab, which is good for tests but bad for clients, many practical problems disappear.

Many haplotypes are so rare that the frequency estimates are based on only one or two people carrying it. Therefore, the reliability of statistical calculations is low, the more so the more extreme the probability appears. Experience will successiv ely eliminate this trouble.

For similar reasons, many exclusions have been experienced practically only very few times if any, which means that the empirical reliability is lower now than it will be in the future.

Generally speaking, it's better to have many systems with low efficiency than one system with great efficiency to make up the same total efficiency. There are three reasons for this: 1) if many systems, then many exclusions are in several systems simultaneously and so support each other to increase reliability, 2)the mean probability of fathers is higher with many systems than with few, 3) frequency variations e g between nationalities tend to cancel out if many systems are used but may have drastic effects if only few or one system employed. On the other hand, it's much more favourable economically to have few systems, and the number of manual operations is less which might tend to reduce certain types of error.

In conclusion, HLA is good and should be used, but discriminately

and definitely not as the only test.

You may be interested to know that I have recently been approached by the American Association of Blood Banks , who have asked 20 experts from various countries to explain their methods of probability calculations in an effort to see if such methods should be adopted in the U S. The chairman of the ad hoc committee on parentage testing is Dr R H Walker, Blood bank, William Beaumont Hospital,Royal Oak, MI 48072, if you feel you want to approach them.

Sorry, no Oxford plans this summer. Hope you're having a pleasant time, and say hallo to our friends !

Best regards, from Katharina too,

Sincerely

Jack

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PROBABILITY OF EXCLUDING A FALSELY ACCUSED MAN OF BEING THE BIOLOGICAL FATHER OF A GIVEN CHILD. (CAUCASIAN FIGURES. DATA WILL VARY WITH OTHER RACIAL GROUPS.)

Source: AMA-ABA Guidelines 1976

ANTIGENS:	ABO	13.42%	
	MNSs	30.95%	
	RHESUS	27.46%	
			Combines Antigens 56.63%
ENZYMES:	*GLO I	18.15%	
	EsD	9.13%	
	*PGM	25.00%	(includes subtyping)
	ADA	4.52%	
	EAP	23.23%	
	AK	4.28%	
	GPT	18.75%	
			Combined Enzymes 68.4%
			Combined Antigens and Enzymes 86.3%
SERUM PROTEINS:			
	Gc	16.61%	
	Hp	18.34%	
	C 3	15.23%	
	GBC	14.43%	
	$alpha_1$AG	17.73%	
			Combined Serum Proteins 59.4%
			Combined Antigens, Enzymes and Serum Proteins 94.4%
TISSUE TYPING:	HLA	90% (Approx.)	
			Combined Antigens, Enzymes, Serum Proteins and HLA 99.44%

*Recent figures

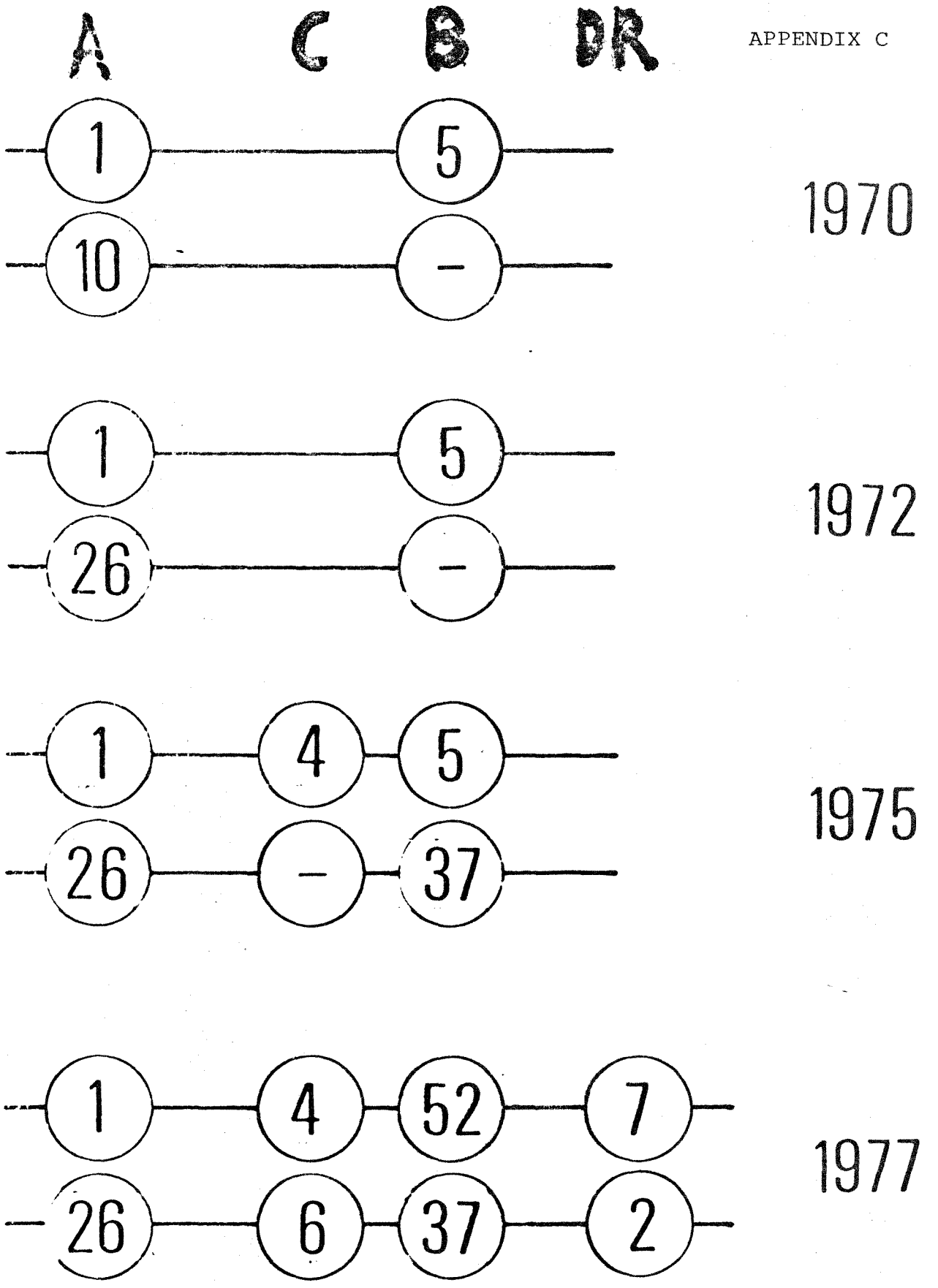
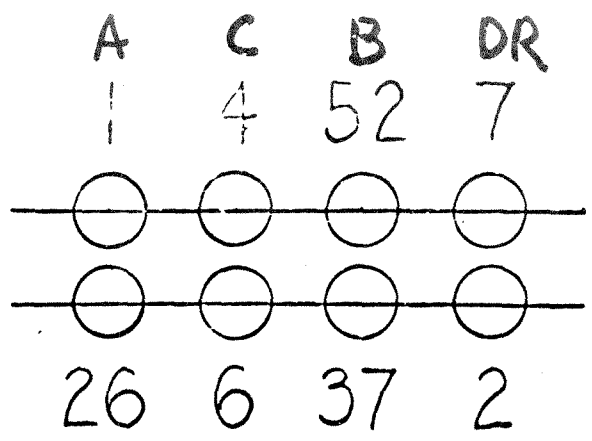
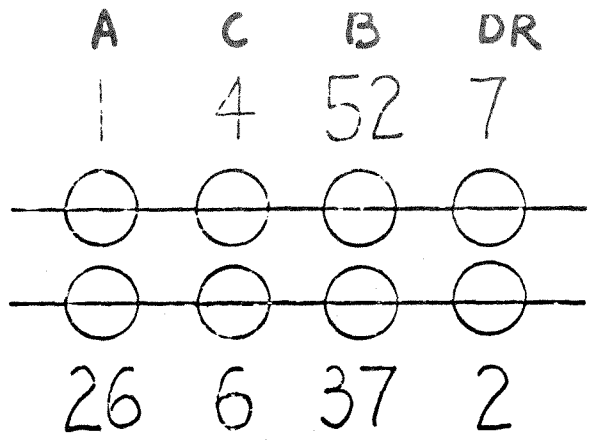
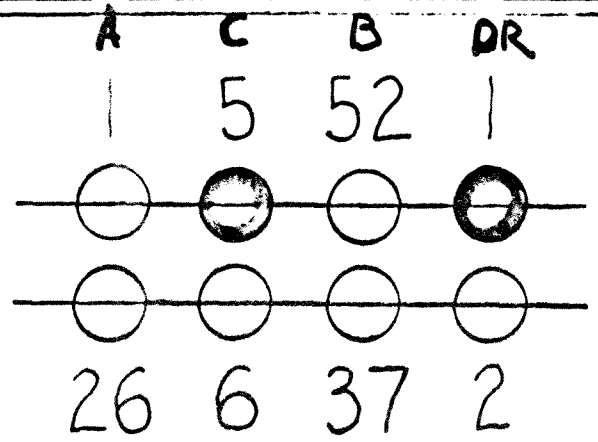


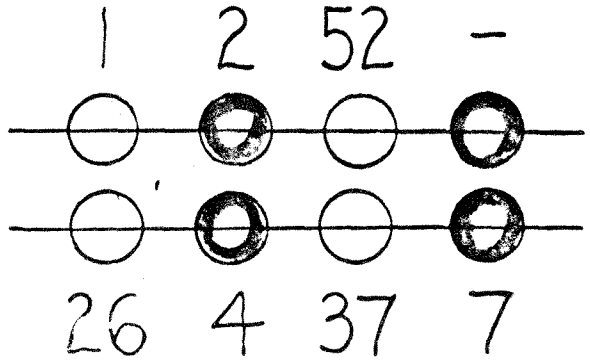
FIG. 1



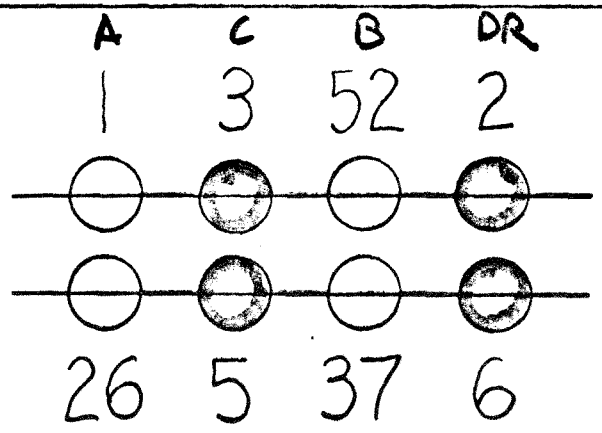
SIBS







UNRELATED



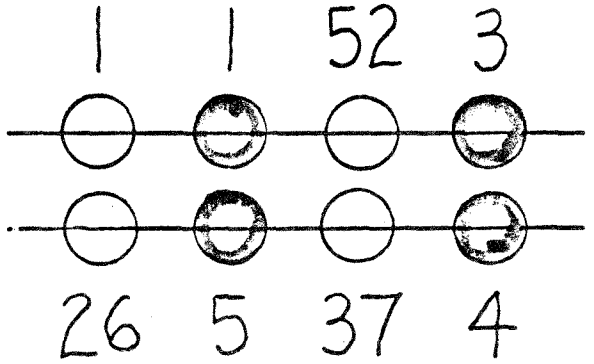


FIG 10

SAN FRANCISCO
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MISSION LAW OFFICE
2701 FOLSOM STREET
SAN FRANCISCO, CALIFORNIA 94110
TELEPHONE (415) 648-7580

September 15, 1980

Assembly Judiciary Committee
California Legislature
State Capitol
Sacramento, CA. 95814

Re: AB 1981

Dear Members of the Committee:

From 1977 to 1979, I handled paternity defense cases at the Legal Aid Society of Orange County. During that period, we used the HLA blood test in every paternity case, constituting about 10 cases per month. My comments regarding AB 1981 are based primarily on that experience.

I have no doubts about the scientific reliability of the HLA test itself when properly performed and analyzed. All of our testing was performed at Dr. Terasaki's laboratory at UCLA under the strictest regimen to ensure accuracy. My first caveat regarding the admissibility of test results to indicate paternity affirmatively goes to who performs the test and analyzes the results. Probability evidence is so strong that the competency of the tester must clearly be established. While this aspect may be addressed in determining "expert" status, the committee should consider placing limitations in the bill on where the test can be administered in order to insure quality control. I believe the Department of Social Services maintains a list of approved facilities for blood testing, but I do not know the extent or degree of investigation prior to approval.

Second, I suggest that not all probabilities but only those above a stated percentage be admissible as evidence of paternity. While the great majority of my cases were either exclusions or non-exclusions with a probability of paternity greater than 90%, the remaining non-exclusion cases ranged from 55% to 89%. Obviously, at some point, a statistical probability of paternity becomes so low as to become meaningless.

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The problem lies in the misunderstanding of the meaning of the statistical figure. I have found many laymen and attorneys too who equate the probability figure with the preponderance of evidence standard. Thus, if the test results show a 60% probability of paternity (based on a random sample of the appropriate population), they automatically assume that it is more likely than not that he is the father and would find paternity on that basis. Such erroneous interpretations of statistical evidence are often made and are the basis of the law's general lack of enthusiasm for such evidence. To avoid such problems, I suggest that the bill permit introduction of blood test evidence to prove paternity only where the probability of paternity exceeds 90%.

Finally, I strongly oppose (for the reasons stated above) allowance of statistical evidence of paternity based on blood testing systems other than HLA. HLA testing is different, as the court found in the Cramer case. The bill should specifically limit such affirmative evidence of paternity to HLA test results and exclude all others until they meet with judicial approval.

I hope the above comments will prove helpful to the Committee.

Sincerely,

Timothy J. Lee

TIMOTHY J. LEE
Attorney at Law.

TJL:mrt

PATERNITY TESTING WITH THE HUMAN LEUKOCYTE ANTIGEN SYSTEM: A MEDICOLEGAL BREAKTHROUGH

I'll prove this truth with my three drops of blood.
Shakespeare
Trolius and Cressida
Act I, Scene III

INTRODUCTION

The California Legislature adopted the Uniform Act on Blood Tests to Determine Paternity[1] in 1953, omitting the last sentence of section 4 of the Act that provided:

> If the experts conclude that the blood tests show the possibility of the alleged father's paternity, admission of this evidence is within the discretion of the court, depending

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The authors wish to thank Dr. Paul K. Terasaki, Ph.D., Professor of Surgery, University of California at Los Angeles; Ms. Tamara A. Harrison, Staff Research Associate, Dep't of Surgery, University of California at Los Angeles; and Robert W. Peterson, J.D., Professor of Law, University of Santa Clara, for their important contributions to the preparation of this article.

1. CAL. EVID. CODE §§ 890-897 (West 1966). Other states which have adopted the UNIFORM ACT ON BLOOD TESTS TO DETERMINE PATERNITY include: ILL. REV. STAT. ch. 40, §§ 1401-1407 (Supp. 1979); LA. REV. STAT. ANN. § 9.396-.398 (West Supp. 1980); N.H. REV. STAT. ANN. § 522:1-:10 (1974); OKLA. STAT. ANN. tit. 10, §§ 501-508 (West Supp. 1979); OR. REV. STAT. §§ 109.250-.262 (1975); 42 PA. CONS. STAT. ANN. §§ 6131-6137 (Purdon 1979); UTAH CODE ANN. §§ 78-25-18 to -23 (1979).

Only two of these states, Illinois and Oklahoma, have statutes similar to California that do not allow for the admissibility of blood test results that fail to exclude the putative father from paternity.

ILL. REV. STAT. ch. 40, § 1404 (Supp. 1979) provides:

> If the court finds, as disclosed by the evidence raised upon the tests, that the alleged father is not the father of the child, the question of paternity shall be resolved accordingly. If the experts disagree in their findings, such findings shall not be admissible, and the question of paternity shall be submitted upon all the evidence.

OKLA. STAT. ANN. tit. 10, § 504 (West Supp. 1979) provides:

> If the court finds that the conclusions of all the experts, as disclosed by the evidence based upon the tests, are that the alleged father is not the father of the child, the question of paternity shall be resolved accordingly. Evidence showing the "possibility" of paternity shall be inadmissible and the question of paternity shall be resolved on the basis of other evidence taken before the court.

upon the infrequency of the blood type.[2]

In September 1978, a state court of appeal in *Dodd v. Henkel*[3] interpreted this omission as a clear act of negative legislative intent. The court held inadmissible results of a blood test that failed to exclude the alleged father (hereinafter putative father) from possible paternity. Four months after the decision in *Dodd,* another appellate court in *Cramer v. Morrison*[4] held this same evidence admissible, citing the California Evidence Code, section 351[5] as controlling.

The sole distinguishing feature between *Dodd* and *Cramer* was the type of blood test on which the assertion of paternity rested. The procedure utilized in *Dodd* incorporated a series of tests known as extended factoring, which included the ABO, MN, and Rh-Hr blood tests.[6] The test results that were admitted in *Cramer* were the product of a recent advance in blood grouping technology known as the Human Leukocyte Antigen system (hereinafter HL-A).

To avoid the result in *Dodd,* the *Cramer* court reasoned that HL-A was not a blood test for the purposes of Evidence Code section 895[7] because it typed white cells rather than red cells. This reasoning is tenuous at best because the legislature did not specifically state that the blood tests covered by sec-

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2. UNIFORM ACT ON BLOOD TESTS TO DETERMINE PATERNITY § 4, 9 U.L.A. 111 (1968).

3. 84 Cal. App. 3d 604, 148 Cal. Rptr. 780 (1978).

4. 88 Cal. App. 3d 873, 153 Cal. Rptr. 865 (1979).

5. CAL. EVID. CODE § 351 (West 1966) provides: "Except as otherwise provided by statute, all relevant evidence is admissible."

6. The ABO, MN, and Rh-Hr blood grouping systems are the traditional tests employed in cases of disputed paternity, albeit not the most informative tests, as the chance of exclusion from paternity varies with the number of genetic markers utilized by a particular system.

Each of these systems types the red cells of the blood. Under the ABO system, four major categories classify blood: A, B, AB, and O. The MN system groups blood into the M, N, and MN types. Rh, rh', rh", hr', and hr" are the classifications in the Rh-Hr system.

Since these systems type for only a limited number of factors, when used in combination they can only yield a 53.9 percent probability of excluding a mistakenly accused defendant.

See generally, 13 J. FAM. L. 713, 731 (1973-1974).

7. CAL. EVID. CODE § 895 (West 1966) provides:

> If the court finds that the conclusions of all the experts, as disclosed by the evidence based upon the tests are that the alleged father is not the father of the child, the question of paternity shall be resolved accordingly. If the experts disagree in their findings or conclusions, the question shall be submitted upon all the evidence.

tion 895 must type exclusively for red cells. Furthermore, the court's analysis avoided the difficult and more crucial question of whether section 895 should be modified given the medical advances provided by the HL-A test.[8]

Legislative response came in the form of a proposed amendment to section 895.[9] Following a brief hearing in the Assembly Judiciary Committee in May 1979, the bill was taken off calendar. Interest in this area was renewed, however, when State Assemblyman Dave Stirling introduced A.B. 1981[10] in January 1980.

This comment will survey the relevant state and federal statutes that govern paternity proceedings and review the mechanics of the HL-A system. The main focus, however, will be on the admissibility and evidentiary weight of blood test results that fail to exclude a putative father *(i.e.,* inclusionary blood test results). The comment concludes with a discussion of future applications of the HL-A system.

State Interests and Paternity Proceedings

The United States Department of Health, Education, and

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8. Thus, we have an appellate ruling that the HL-A test result that establishes actual paternity is admissible in evidence despite the existence of a statute that provides for admissibility only in the event of an exclusion.

1 Disputed Paternity Proceedings § 8.18 (Schatkin ed. 1979) (hereinafter cited as Schatkin).

Cramer v. Morrison has been cited with approval in County of Fresno v. Superior Court, 92 Cal. App. 3d 133, 136-38, 154 Cal. Rptr. 660, 662-63 (1979).

9. If the court finds that the conclusions of all the experts, as disclosed by the evidence based upon the tests, are that the alleged father is not the father of the child, the question of paternity shall be resolved accordingly. If the experts disagree in their findings or if the experts conclude that the tests show the possibility of the alleged father's paternity, the question shall be submitted upon the evidence including the evidence of probability based upon the infrequency of the relevant blood types involved.

AB 1727, Cal. Leg., 1979-1980 Reg. Sess. (as amended May 21, 1979) (died in committee).

10. If the court finds that the conclusions of all the experts, as disclosed by the evidence based upon the tests, are that the alleged father is not the father of the child, the question of paternity shall be resolved accordingly. If the experts disagree in their findings or if the experts conclude that the tests show the possibility of the alleged father's paternity, the question may, subject to section 352, be submitted upon all the evidence, including the evidence of probability based upon the tests.

AB 1981, Cal. Leg., 1979-1980 Reg. Sess. (Jan. 7, 1980).

Welfare estimated the number of illegitimate live births in 1974 at 418,000, a significant increase over the 1965 figure of 291,200.[11] This dramatic rise in so short a time did not go unnoticed by the country's lawmakers, and in 1975, Congress established guidelines to control the distribution of federal assistance funds. Each state was encouraged to develop a plan to administer assistance with the goal of making present welfare recipients independent of future aid programs.[12]

Section 602(a)(26)(B) of Title 42 of the United States Code requires that state plans provide a program whereby the states will undertake to establish paternity and secure support for a child born out of wedlock.[13] Even where an individual is not eligible for such federal aid to dependent children, child support collection or paternity determination services are available upon request for a reasonable fee.[14]

California responded to the federal guidelines by enacting sections 11475.1,[15] 11476,[16] and 11350.1[17] of the Welfare and

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11. U.S. DEP'T OF HEALTH, EDUCATION, AND WELFARE, VITAL STATISTICS OF THE U.S. 1-45 (1975).

12. 42 U.S.C. § 1397 (1976).

13. 42 U.S.C. § 602 (a)(26)(B)(i) (1976).

14. 42 U.S.C. § 654 (6)(A),(B) (1976).

15. Section 11475.1 provides, in pertinent part:

> Each county shall maintain a single organizational unit located in the office of the district attorney which shall have responsibility for promptly and effectively enforcing the obligation of parents to support their children and determining paternity in the case of a child born out of wedlock. The district attorney shall take appropriate action, both civil and criminal, to enforce this obligation when the child is receiving public assistance and when requested to do so by the individual on whose behalf the enforcement efforts will be made when the child is not receiving public assistance. There shall be prominently displayed in every public area of every office of the units established by this section a notice, in clear and simple language prescribed by the Director of . . . Social Services, that child support enforcement services are provided to all individuals whether or not they are recipients of public social services.
>
> Nothing herein shall prohibit the district attorney from entering into cooperative arrangements with other county departments as necessary to carry out the responsibilities imposed by this section pursuant to plans of cooperation with such departments approved by the State Department of Social Services.

CAL. WELF. & INST. CODE § 11475.1 (West Supp. Pamph. 1973-1978).

16. Section 11476 provides, in pertinent part:

> It shall be the duty of the county department to refer all cases where a parent is absent from the home, or where the parents are unmarried and parentage has not been determined by a court of competent jurisdiction, to the district attorney immediately at the time the applica-

Institutions Code. In addition, section 11477[18] of that code requires that applicants, as a condition of eligibility for aid,

> [c]ooperate with the county welfare department and district attorney in establishing the paternity of a child born out of wedlock with respect to whom aid is claimed, and in obtaining any support payments due any person for whom aid is requested or obtained.[19]

Failure to cooperate is grounds for withholding aid to the applicant. If aid to the adult is withheld, any aid for which the child is otherwise eligible will be provided in the form of protective payments.[20]

A remarkable feature of paternity actions is the high conviction rate.[21] One explanation is that many defendants sim-

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tion for assistance, or certificate of eligibility, is signed by the applicant or recipient. . . .

Upon referral from the county department, the district attorney shall investigate the question of nonsupport or paternity and shall take all steps necessary to obtain support for the needy child and determine paternity in the case of a child born out of wedlock.

CAL. WELF. & INST. CODE § 11476 (West Supp. Pamph. 1973-1978). Section 11476.1 provides, in pertinent part:

> In any case where the district attorney has undertaken enforcement of support, the district attorney may enter into an agreement with the noncustodial parent, on behalf of the custodial parent, a minor child, or children, for the entry of a judgment determining paternity, if applicable, and for periodic child support payments based on the noncustodial parent's reasonable ability to pay.

CAL. WELF. & INST. CODE § 11476.1 (West Supp. Pamph. 1973-1978).

17. Notwithstanding the provisions of any other statute, in any action brought by the district attorney for the support of a minor child or children, the action may be prosecuted in the name of the county on behalf of such minor child or children. The mother shall not be a necessary party in such action but may be subpoenaed as a witness. In an action under this section there shall be no joinder of actions, or coordination of actions, or cross-complaints, and the issues shall be limited strictly to the question of paternity, if applicable, and child support. Nor shall such support or paternity action be delayed or stayed because of the pendency of any other action between the parties. Nothing herein contained shall be construed to prevent the parties from bringing an independent action under the Family Law Act or otherwise, and litigating the issue of support. In such event, the court in such proceedings shall make an independent determinaton on the issue of support which shall supersede the order made pursuant to this section.

CAL. WELF. & INST. CODE § 11350.1 (West Supp. Pamph. 1973-1978).

18. CAL. WELF. & INST. CODE § 11477(b) (West Supp. Pamph. 1973-1978).

19. *Id.*

20. *Id.*

21. Rates of conviction reaching 95% are not uncommon in paternity actions. Krause, *Scientific Evidence and the Ascertainment of Paternity*, 5 FAM. L.Q. 252,

ply admit paternity. Possible motives behind a defendant's admission include:

> (1) a sincere belief that he is the father, (2) a sense of pride arising from the fact that he could be the father, (3) a total lack of financial responsibility and, therefore, a careless attitude toward the situation, (4) inability to afford defense of the action and costs of blood tests and other evidence, or (5) a state of ignorance which confuses intercourse with paternity.[22]

Even if the defendant does not admit paternity, another factor that may explain the high conviction rate was explained by the California Supreme Court in *Huntington v. Crowley*.[23] The court noted that

> in the emotional atmosphere generated in the courtroom by the spectacle of the unwed mother and the unwanted baby, it will often not be enough for an unjustly accused man to simply deny paternity, especially when . . . he concededly has had sexual intercourse with the mother at an earlier date.[24]

Further criticism of the system was leveled by Professor Harry D. Krause. He commented:

> [C]urrent paternity prosecution practice in many metropolitan areas is abhorrent. Blackmail and perjury flourish, accusation is often tantamount to conviction, decades of support obligation are decided upon in minutes of court time and indigent defendants usually go without counsel or a clear understanding of what is involved.[25]

Moreover, simple lack of income will not insulate a man from a paternity action. This is true for a variety of reasons. First, although the putative father may not have any funds at present, future employment may generate income that could be used to support his child. This is especially significant since child support obligations are not dischargeable in bankruptcy.[26] Second, liquid assets are not the sole indicia of a

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254 (1971).

22. Sussman & Schatkin, *Blood-Grouping Tests in Undisputed Paternity Proceedings*, 164 J.A.M.A. 249 (1957).

23. 64 Cal. 2d 647, 414 P.2d 386, 51 Cal. Rptr. 254 (1966).

24. *Id.* at 651, 414 P.2d at 386, 51 Cal. Rptr. at 258.

25. Krause, *supra* note 21 at 255.

26. 11 U.S.C. § 35 (a)(7); Salas v. Cortez, 24 Cal. 3d 22, 28, 593 P.2d 226, 230, 154 Cal. Rptr. 529, 533 (1979).

man's ability to support a family. Life insurance policies, survivor's benefits, health insurance plans, worker's compensation, and wrongful death claims are valuable assets that may provide future financial security.[27]

Blood Tests In Paternity Actions

Historical Perspective

A brief history of the use of blood test evidence in California paternity proceedings begins with the infamous decision, *Berry v. Chaplin*.[28] In that case, a blood test showing that the putative father, actor Charles Chaplin, could not have fathered the child was held inconclusive on the issue of nonpaternity. The evidence was merely considered and weighed with all other evidence in the case.[29] The majority of the court felt bound to apply the law set forth in *Arias v. Kalensnikoff*,[30] which stated that such evidence was not conclusive unless declared so by the legislature in the code.[31] Justice McComb, in a concurring opinion, also felt bound by *Arias*, but it was his belief that the *Arias* case was incorrectly decided because it ignored advances made by the medical profession.[32] Speaking of the ABO and MN blood tests, he said that "to reject the new and certain for the old and uncertain does not tend to promote improvement in the administration of justice."[33]

In response to the adverse publicity and notoriety given the *Chaplin* case, the California Legislature adopted the Uniform Act on Blood Tests to Determine Paternity.[34] Section 4 of the Act provides:

> If the court finds that the conclusion of all the experts, as disclosed by the evidence based upon the tests, are [sic] that the alleged father is not the father of the child, the question of paternity shall be resolved accordingly.[35]

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27. Krause, *Child Welfare, Parental Responsibility and the State*, 6 Fam. L.Q. 377, 388-89 (1972).
28. 74 Cal. App. 2d 652, 169 P.2d 442 (1946).
29. *Id.* at 664-65, 169 P.2d at 451.
30. 10 Cal. 2d 428, 74 P.2d 1043 (1937).
31. *Id.* at 432, 74 P.2d at 1046.
32. 74 Cal. App. 2d at 668, 169 P.2d at 453 (McComb, J., concurring).
33. *Id.*
34. Cal. Evid. Code §§ 890-897 (West 1966).
35. Cal. Evid. Code § 895 (West 1966).

Blood tests are now dispositive of the issue of nonpaternity except where the Evidence Code's conclusive presumption of legitimacy comes into play.[36] That is, where the husband and wife are cohabitating during the period when conception occurred, the husband is conclusively presumed to be the father unless he is impotent or sterile.[37] This law has withstood constitutional challenge.[38]

There is strong support, however, for the contention that the presumption of legitimacy should be rebuttable through a showing of blood test results that exclude the husband as being genetically capable of fathering the child in question.[39]

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36. CAL. EVID. CODE § 621 (West Supp. 1980). Public policy underlying the conclusive presumption is suggested as: 1) preserving family integrity, 2) avoiding the stigma of illegitimacy, and 3) reducing the financial burden of the state. Bois, *California's Conclusive Presumption of Legitimacy—Its Legal Effect and Its Questionable Constitutionality*, 35 S. CAL. L. REV. 437, 465 (1962).

37. CAL. EVID. CODE § 621 (West Supp. 1980); Hoffman, *California's Tangled Web: Blood Tests and the Conclusive Presumption of Legitimacy*, 20 STAN. L. REV. 754 (1968).

38. *See, e.g.*, Kusior v. Silver, 54 Cal. 2d 603, 354 P.2d 657, 7 Cal. Rptr. 129 (1960).

In a recent case, County of San Diego v. Brown, 80 Cal. App. 3d 297, 145 Cal. Rptr. 483 (1978), a white woman was married to a black man, who was not impotent during the period of conception. The woman gave birth to a white child. The husband denied paternity and attempted to offer proof of nonpaternity. He contended that: 1) the allegation that he fathered the child was contrary to the laws of nature, 2) the conclusive presumption, which denied him the opportunity to rebut paternity, deprived him of due process guaranteed under the California and United States Constitutions, and 3) application of the conclusive presumption of legitimacy denied him equal protection of laws. *Id.* at 301, 145 Cal. Rptr. at 484. The court held that there was no racial exception to the conclusive presumption of legitimacy, indicating that the rationale behind the presumption is to protect the integrity of the family while the husband and wife are living together. The court also rejected the defendant's constitutional claims, stating that the presumption of legitimacy bore a rational relationship to the state's goal of protecting family integrity. *Id.* at 308, 145 Cal. Rptr. at 489. *See also In Re* Marriage of Guardino, 95 Cal. App. 3d 77, 156 Cal. Rptr. 883 (1979); People v. Thompson, 89 Cal. App. 3d 193, 152 Cal. Rptr. 478 (1979).

39. Hoffman, *supra* note 28, at 764; Twardy, *Blood Groups in Bastardy, Paternity, Heredity and Criminal Cases*, MED. TRIAL TECH. Q. 317, 322 (1976); Lamb, *Blood-Grouping Tests and the Presumption of Legitimacy*, 50 N.C. L. REV. 163, 172 (1971); Waters, *Blood Tests and the Presumption of Legitimacy*, 118 N.L. J. 79, 80 (1968); Comment, *Irrebatable Presumption of California Evidence Code Section 621*, 12 U.C.D. L. REV. 452 (1979).

Of the eight states that have adopted the UNIFORM ACT ON BLOOD TESTS TO DETERMINE PATERNITY, four have adopted statutes providing for the overcoming of the presumption of legitimacy by blood test results that exclude the husband from paternity. *See* ILL. REV. STAT. ch. 40, § 1405 (Supp. 1979); LA. REV. STAT. ANN. § 9:397.3 (West Supp. 1980); N.H. REV. STAT. ANN. § 522:5 (1974); OKLA. STAT. ANN. tit. 10, § 505 (West Supp. 1979).

But the courts have balked, and even here, blood test evidence has been rejected as counterproductive to the state goal of maintaining family integrity.[40]

Human Leukocyte Antigen System (HL-A)

HL-A was originally developed in 1964 by Dr. Paul I. Terasaki, Professor of Surgery at the University of California at Los Angeles, to minimize the possibility of organ transplant rejection.[41] Subsequent research by scientists indicated a correlation between specific HL-A types and the presence of disease.[42]

HL-A was first used in paternity studies in the 1970's. As early as 1976, the Joint AMA-ABA Guidelines recognized that HL-A typing had already been used in Europe for paternity exclusion and had been successful in many cases where red cell typing (*e.g.*, ABO) had failed to exclude paternity.[43] Since that time, HL-A has been heralded as "the most potent system now available for paternity testing . . . ."[44]

The significant advantage of HL-A over other blood typing tests is that *all* HL-A types are relatively rare.[45] Thus, if a putative father shares a combination of HL-A types with a child, a high percentage of inclusion (the chance that he is the father) results.[46] Although extremely high exclusion rates are

40. Hoffman, *supra* note 37, at 760. *See also* Lamb, *supra* note 39, at 170.

41. Baird, *Paternity Test Reducing Suits Going to Trial*, Los Angeles Times, Aug. 7, 1978, § 2, at 1, col. 6.

42. Their findings indicated that out of one hundred diseases which have been investigated in population studies, evidence of association has been reported for more than half of them. One of the most significant examples of this relationship is that of the disease ankylosing spondylitis, an inflammatory back condition, where the risk is ten times as high for those with HL-A antigen W27 than that in the overall population. Other significant relationships have been found to exist with psoriasis and hemochromatosis, a disorder of iron metabolism. 238 SCI. AM. 64, 66 (Jan. 1978). Schlosstein, Terasaki, Bluestone, and Pearson, *High Association of an HL-A Antigen, W27, with Ankylosing Spondylitis*, 288 NEW ENG. J. MED. 704, 705 (1973); Amos, Inou, and Rowlands, *Human Histocompatibility Antigens and Susceptibility to Disease*, 182 SCI. 183 (1973).

43. *Joint AMA-ABA Guidelines: Present Stages of Serologic Testing in Problems of Disputed Paternity*, 10 FAM. L.Q. 247, 276 (1976) (hereinafter cited as *Joint Guidelines*).

44. Jeannet, Hassig, & Burnheim, *Use of the HL-A Antigen System in Disputed Paternity Cases*, 23 VOX SANGUIN 197, 200 (1972).

45. Terasaki, Gjertson, Bernoco, Perdue, Mickey, & Bond, *Twins with Two Different Fathers Identified by HLA*, 299 NEW ENG. J. MED. 590 (1978).

46. It has been claimed that the chance of excluding paternity by the HL-A test equals or exceeds the chance obtained with all blood and serum groups combined.

possible products of multiple testing, costs and diminishing returns render excessive multiple testing impractical.[47]

Genetic concerns in blood grouping. At this point, it is important to note the three factors that enable scientists to draw conclusions from blood grouping about the identity of a child's parents: 1) the blood group of a person can be determined at birth, 2) the blood group remains constant throughout life, and 3) a child inherits his or her blood group from the parents in accordance with known genetic laws.[48] These ge-

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Wiener & Socha, *Methods Available for Solving Medicolegal Problems of Disputed Parentage*, 21 J. FOR. SCI. 42, 61 (1976).

A sample of statistics showing exclusion rates for some selected tests along with combined rates have been calculated.

THE CHANCE OF AN ENGLISHMAN BEING EXONERATED, BY THE BLOOD GROUPS, OF A FALSE CHARGE OF PATERNITY BROUGHT BY AN ENGLISHWOMAN

	Exclusion by each system	Combined exclusion
1. ABO	0.1760	0.1760
2. MNSs	0.2390	0.3729
3. Rh	0.2520	0.5309
4. Kell	0.0879	0.5487
5. Lutheran	0.0333	0.5637
6. Duffy	0.0174	0.5844
7. Kidd	0.0486	0.5963

R. RACE & SANGER, BLOOD GROUPS IN MAN 360 (4th ed. 1962).

47. Krause, *supra* note 21, at 259; *Joint Guidelines, supra* note 43, at 254-55. For example, if initial tests exclude 90% of the putative fathers, a proposal to do another test offering a 10% exclusion rate will only raise the total exclusion rate from 90% to 91%. Thus, the accused derives only one-tenth of the potential value of this additional test, for the same cost. L. SUSSMAN, PATERNITY TESTING BY BLOOD GROUPING 128-29 (2d ed. 1976).

This chart lists the individual probability of excluding non-fathers of three racial populations for each of the seven systems recommended by the AMA-ABA Joint Guidelines.

MEAN PROBABILITY OF EXCLUSION OF NON-FATHERS

SYSTEM	Black	White	Japanese
1. ABO	.1774	.1342	.1917
2. RH	.1859	.2746	.2050
3. MNSs	.3206	.3095	.2531
4. Kell	.0049	.0354	0
5. Duffy	.0420	.1844	.1159
6. Kidd	.1545	.1869	.1573
7. HLA	.78-.80	.78-.80	.78-.80

Joint Guidelines, supra note 43, at 257.

48. Lamb, *supra* note 39, at 165. The HL-A test was utilized to determine the father prior to birth in a case in Sweden where a white woman married to a black man had an affair with a white man. The couple required the information prior to

netic laws, called Rules of Inheritance, state:

> 1. A child cannot have a genetic marker [or expression] which is absent in both parents.
> 2. A child must inherit one of a pair of genetic [expressions] from each parent.
> 3. A child cannot have a pair of identical genetic [expressions] (aa) unless both parents have the [expression] (a).
> 4. A child must have the genetic [expression] (a or b) which is present as an identical pair in one parent (aa or bb).[49]

Thus, if a child has a blood factor not found in the mother, that factor must have come from the father. If a putative father lacks a blood factor found in the child that could not have been obtained from the mother, the putative father cannot be the father of that child.[50] This result is termed an exclusion.

Genetics and HL-A. The Human Leukocyte Antigen system is based upon the identification of antigens, substances that stimulate antibody production when introduced into another human body. Because the HL-A test detects antigens by using antisera (antibodies), it is known as a serologic test.

Genes control the production of antigens in the body. Since a person's genetic makeup (genotype) is inherited, one half from each parent, it is therefore possible to make certain probability of paternity calculations by identifying antigens present on the surface of the white blood cell.

It is important to understand certain terms with regard to HL-A testing. First, all living cells have a nucleus. The genes necessary for cellular reproduction are located on chromosomes that exist in duplicate in the nucleus of a given cell. The position of a gene on a chromosome is called a locus. Two of these loci, A and B, located at the HL-A region of the chromosome, are used to evaluate parentage.

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birth in order to decide whether the woman should have an abortion.

49. Lee, *Current Status of Paternity Testing*, 9 FAM. L.Q. 615, 621 (1975).

50. The laws of inheritance may be altered if a mutation occurs. The mutation rate for humans, however, is extremely low, on the order of one in one million. This has led blood group specialists to doubt whether blood group genes do mutate. Dodd, *The Scope of Blood Grouping in the Elucidation of Problems of Paternity*, 9 MED. SCI. L. 59 (1969). Such evidence provides ample rebuttal for the frequent courtroom argument that a mutation has altered the laws of theoretical expectancy. Sussman, *supra* note 47, at 133.

Each antigen has two genetic expressions at a given locus; these two expressions are called alleles. One allele from the A locus is paired with one allele from the B locus. The pair occurs on the same chromosome in a combination known as a *haplotype*. Two haplotypes, one from each parent, comprise the child's *genotype*. With only the A and B loci considered, a total of four HL-A antigens occur on a white cell. Should less than four antigens occur on the white cell, the individual may be *homozygous*, a term that describes the presence of identical alleles at a particular locus; or he may express a *blank*, meaning that he possesses an antigen that, as yet, has not been detected. Undetectable antigens at the A and B loci are very rare.[51]

Final results of the HL-A paternity test are expressed in one of two ways. First, there may be an *exclusion*, where the putative father could not possibly have fathered the child in accordance with known genetic principles.[52] The second possibility is *inclusion*, where the accused could either be the father or a random man who just happens to have the required genetic expression.[53] Inclusionary test results are expressed in terms of a probability of paternity calculated by comparing the frequency with which the paternal haplotype occurs in the random population and the likelihood that the putative father's A and B loci antigens are paired such that he does have the true paternal haplotype.[54] If a given putative father is not excluded, the unique feature of HL-A is that he can be assigned a high probability of paternity: this is almost impossible to obtain by conventional blood testing.[55]

One study that resolved one thousand cases of paternity not otherwise resolved by ABO testing, provided the following results:

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51. Terasaki, *Resolution by HLA Testing of 1000 Paternity Cases Not Excluded by ABO Testing*, 16 J. FAM. L. 54-56, 544-45 (1977-78).

52. *See* notes 48-49 and accompanying text *supra*.

53. Lee, *supra* note 49, at 631.

54. Terasaki, *supra* note 51, at 546.

55. *Id.* at 552. "HLA is a super-system as compared with all the others . . . . There is no doubt that the percentage of exclusion by HLA will soon reach 99 percent, and 99.9 percent is not a wild guess." Schatkin, *supra* note 8, at § 8.08.

Total Sample Inclusions and Exclusions N = 1,000	Probability of Paternity	Inclusions Only N=750
25%	Excluded	-----
16%	99-100	21.3%
15%	98-99	20.0%
33%	90-98	44.0%
10%	Not Resolved	13.3%[58]

The results of this study are a clear indication that, if a putative father is not excluded by the HL-A test, the resulting inclusion rate (the probability of paternity) is very likely to be over ninety percent.[57] Figures derived from further studies with an additional two thousand cases, show that eighty-seven percent of all inclusionary cases resulted in a probability of paternity equaling or exceeding ninety percent.[58]

In light of continuing research in the area of serological testing, future percent probability of paternity figures can be expected to rise. This is due to the fact that as the number of known antigens increases, there will be a corresponding decrease in the likelihood that two people will possess identical haplotypes.

Assumptions underlying the HL-A paternity test. There are three key assumptions underlying the HL-A paternity test. First, the mother and putative father must have engaged in sexual intercourse at least once during the period of possible conception. This is self-evident. The second assumption is that a random man exists who has had access to the mother equal to that of the putative father. Third, the parties to be tested must be capable of being correctly identified as to their racial group.

The working hypothesis giving rise to the second assumption, that both one other non-excluded random man and the putative father had equal access to the mother, has been criticized because "a comparison of the putative father with a non-random man might better approximate the true situa-

56. Terasaki, *supra* note 51, at 552-53.

57. *Id.*

58. Interview with Tamara A. Harrison, Staff Research Associate, Dep't of Surgery, University of California at Los Angeles (December 18, 1978).

tion."[59] Futhermore, sexual relations do not generally occur on an equal access basis. In other words, the probability of a woman having sexual intercourse with man A, an accessible partner, is not necessarily equivalent to the probability of her having intercourse with man B, a second accessible partner.

The assumption of equal access implies that both the putative father and the non-excluded random man have a fifty-percent chance of fathering the child. This takes no account for other factors that influence the probability that sexual intercourse will result in pregnancy. Assuming that a woman would have had sexual relations with two men, both having the necessary haplotypes to have fathered the child, the results of the HL-A paternity test would evaluate both men as having the same percent probability of paternity. The test does not account for such crucial factors as: 1) the frequency of intercourse (*e.g.*, the woman may have had intercourse with man A twelve times during the period of possible conception, while having intercourse only once with man B); 2) a significantly greater sperm count in man A compared with man B; 3) the woman's natural fertility cycle (*e.g.*, she may have had intercourse with man A during her highly fertile period as opposed to having intercourse with man B during a period of low fertility); and 4) the non-use of birth control devices or methods during intercourse with man A versus the use of highly reliable methods of contraception during intercourse with man B. The corroborative evidence presented in this hypothetical suggests that man A would have a much greater chance of fathering the child, yet this greater probability would not be reflected in the results of the HL-A tests.

Finally, haplotype frequencies vary among different racial groups. Thus, accurate probabilities of haplotype repetition can only be calculated if the parties are correctly typed with respect to race. In most instances this will not be a problem. In cases of mixed racial ancestry, however, ascertaining a person's racial group may prove to be more difficult. This will be of special significance where one of the parents has been adopted and records of family history are not available.

The need for scientific evidence of inclusion. The backbone of any litigation is the evidence that is gathered and admitted to substantiate a claim. In particular, the overall quali-

59. *Joint Guidelines, supra* note 43, at 262.

ty of evidence in a paternity action seems inherently problematic. Seldom are there accurate and reliable eyewitnesses to intimate sexual activity, and self-serving testimony is always questionable.[60] The problem of perjured testimony is particularly acute. Studies of paternity complainants, putative fathers, and witnesses indicate that approximately eighty-two percent may have committed perjury on the stand.[61] A study of undisputed paternity cases indicated that nine percent of the men admitting paternity were not the true fathers of the children they accepted.[62]

Clearly, there is a need for objective scientific evidence that does not depend upon recollection or veracity of witnesses.[63] HL-A blood test results are exemplary since blood groups obey Mendelian laws of inheritance.[64] There is a fear, however, that admission of scientific evidence will usurp the court's decision-making function[65]—that a paternity action will become nothing more than a trial of the blood. This analysis, however, may obscure the real problem. Attention should focus upon court recognition of reliable scientific evidence, rather than the maintenance of some bastard notion of judicial authority.[66]

The current test for the admission of scientific evidence was established in 1923 in *Frye v. United States*.[67] *Frye* requires that scientific evidence be "sufficiently established to have gained general acceptance in the particular field in which it belongs."[68] California, has adopted this standard, noting that its major advantage lies in the articulation of a conservative approach.[69] Extensive periods of time generally intervene

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60. Larson, *Blood Test Exclusion Procedures in Paternity Litigation: The Uniform Acts and Beyond*, 13 J. FAM. L. 713, 713-14 (1973-74).

61. Arther & Reid, *Utilizing the Lie Detector Technique to Determine the Truth in Disputed Paternity Cases*, 45 J. CRIM. L.C. & P.S. 213, 215 (1954).

62. Sussman & Schatkin, *supra* note 22, at 250.

63. Whitlatch & Marsters, *Contribution of Blood Tests in 734 Disputed Paternity Cases: Acceptance by the Law of Blood Tests as Scientific Evidence*, 14 CASE W. RES. L. REV. 115, 115 (1962).

64. Dodd, *supra* note 50 at 56.

65. *See* Rasco v. Rasco, 447 S.W. 2d 10, 17 (Mo. Ct. App. 1969).

66. Rahm, *Children Born in Wedlock: Blood Tests and the Presumption on Legitimacy in Missouri*, 39 U. MO. KAN. CITY L. REV. 121, 125 (1970).

67. 293 F. 1013 (D.C. Cir. 1923).

68. *Id.* at 1014.

69. People v. Kelly, 17 Cal. 3d 24, 31, 549 P.2d 1240, 1245, 130 Cal. Rptr. 144, 149 (1976).

between scientific discoveries and their acceptance as evidence in court proceedings.[70]

Although HL-A has been accepted by the California courts as scientific evidence of non-paternity,[71] reservations do exist as to its validity for inclusionary purposes (*i.e.*, establishing paternity). HL-A cannot definitely establish a non-excluded male as the father of a child, but it can generate a reliable figure that represents the probability of paternity. The question is whether a probability of paternity statistic should be legally cognizable by the courts.[72]

The argument that an acceptable inclusionary blood test for paternity must reach absolute certainty confuses the scientific with the legal definition of fact.[73] Presently, paternity cannot be proven to a degree of absolute certainty, but the standard of proof required in a paternity action is preponderence of the evidence. The degree of certainty generated by the HL-A paternity test (eighty-seven percent of all inclusionary tests result in a percent probability of paternity of ninety percent or greater[74]) strongly indicates that HL-A paternity testing provides relevant evidence to be weighed by the fact finder along with all other evidence in the case.[75]

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70. People v. Spigno, 156 Cal. App. 2d 279, 289, 319 P.2d 458, 464 (1957).

71. *See, e.g.*, Long v. Gelbach, No. 232373 (Super. Ct. Orange County 1976).

72. The following table represents common probability of paternity figures and adjectives that describe their significance.

Probability	Likelihood of Paternity
99.80-99.90	Practically proved
99.1 -99.75	Extremely likely
95 -99	Very likely
90 -95	Likely
80 -90	Undecided
< 80	Not useful

Adapted from *Joint Guidelines*, *supra* note 43, at 262.

73. "Before the scientist will speak of 'fact' he will insist on absolute certainty. The lawyer, however, customarily operates on a far lower level of certainty." Krause, *supra* note 47, at 260. *But see* Jaffe, *Comment on the Judicial Use of HLA Paternity Results and Other Statistical Evidence: A Response to Terasaki*, 17 J. FAM. L. 457, 483-84 (1978-79).

74. Harrison, *supra* note 58.

75. Admissibility of inclusionary HL-A blood test results should be allowed only upon a prior finding by the trier of fact that sexual intercourse did occur on at least one occasion between the parties during the period of conception. Second, to be admissible, the percent probability of paternity figure must be equal to or greater than 90 percent, a figure which Hummel (*see* note 72 *supra*) describes as indicating a "likely" likelihood of paternity.

Some HL-A critics will no doubt point to *People v. Collins*[76] for the proposition that mathematical probabilities have no place in the courtroom. In *Collins*, the California Supreme Court held it was reversible error for the trial court to admit testimony of a mathematician to the effect that there was a high probability that the two defendants perpetrated the alleged crime.[77] Two problems arose in connection with the evidence presented in *Collins*. First, the proffered probabilities were unsupported by scientific statistical data, and second, use of the probabilities distorted the issues put before the jury.[78] The court pointed out that the use of probabilities would foreclose an effective defense by an attorney unschooled in mathematics, thereby disadvantaging the quality of the defense.[79] Moreover, the court stated that applications of mathematical probabilities especially in criminal cases, "must be critically examined in view of the substantial unfairness to a defendant which may result from ill conceived techniques with which the trier of fact is not technically equipped to cope."[80]

Comparing the results of the HL-A paternity test with the evidence used in *Collins*, the first error—lack of appropriate scientific statistical data to formulate the probabilities—is not present.[81] Genetic frequencies that are the basis of the HL-A test are the product of extensive scientific research and investigation of a wide variety of human populations. The second problem, jury confusion, is not so easily dismissed.

In *Collins*, the court found that "[t]he prosecution's approach . . . could furnish the jury with absolutely no guidance on the crucial issue: *Of the admittedly few such couples, which one, if any, was guilty of committing this robbery?*" [82] In terms of blood test evidence in a paternity action, the analogous question is: Of the admittedly few men carrying the proper haplotype, which one fathered the child? Thus, the fear expressed in allowing the use of inclusionary blood test

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76. 68 Cal. 2d 319, 438 P.2d 33, 66 Cal. Rptr. 497 (1968).
77. *Id.*
78. *Id.* at 327, 438 P.2d at 38, 66 Cal. Rptr. at 502.
79. *Id.*
80. *Id.* at 332, 438 P.2d at 41, 66 Cal. Rptr. at 505.
81. Comment, *The Use of Blood Tests to Prove Paternity in California*, 3 U.S.F. L. REV. 297, 307 (1969).
82. 68 Cal. 2d at 330, 438 P.2d at 40, 66 Cal. Rptr. at 504 (emphasis in the original).

evidence is that the paternity action will be reduced to a "trial by mathematics."[83]

Other evidence in the case, however, could prevent any miscarriage of justice. Wigmore suggested that evidence of physical resemblance be admitted only after it has been shown that the putative father and the mother engaged in sexual intercourse.[84] Applying this suggestion to the instant problem, the results of blood tests that fail to exclude the putative father should be admissible only after it has been shown that the mother and putative father had sexual intercourse with one another during the period of possible conception.[85]

Perhaps the greatest problem with admission of inclusionary blood test results is the reverence accorded scientific evidence by jurors.[86]

> Lay jurors tend to give considerable weight to "scientific" evidence when presented by "experts" with impressive credentials. We have acknowledged the existence of a . . . "misleading aura of certainty which often envelops a new scientific process, obscuring its currently experimental nature."[87]

In defense of the jury's ability to weigh evidence adequately and fairly, the court in *People v. Long*[88] recognized:

> A juror is not some kind of dithering nincompoop, brought in from never-never land and exposed to the harsh realities of life for the first time in the jury box . . . . Jurors are our peers, often as well educated, as well balanced, as stable, as experienced in the realities of life as the holders of law degrees . . . . The supposed influence on jurors . . . exists more in the imagination of judges and lawyers than in reality.[89]

The scientific basis of the HL-A paternity test can ade-

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83. *Id.* at 332, 438 P.2d at 41, 66 Cal. Rptr. at 505.

84. 1 J. WIGMORE, WIGMORE ON EVIDENCE 623 (3d ed. 1940).

85. Comment, *supra* note 81, at 308.

86. CAL. EVID. CODE § 352 (West 1966) deals with this problem.

87. People v. Kelly, 17 Cal. 3d at 31-32, 549 P.2d at 1245, 130 Cal. Rptr. at 149 (1976) (citing Huntington v. Crowley, 64 Cal. 2d 647, 656, 414 P.2d 386, 390, 51 Cal. Rptr. 254, 262 (1966)). *See also* United States v. Addison, 498 F.2d 741, 744 (D.C. Cir. 1974); People v. Nichols, 341 Mich. 311, 331-32, 67 N.W.2d 230, 232 (1954).

88. 38 Cal. App. 3d 680, 113 Cal. Rptr. 530 (1974).

89. *Id.* at 689, 113 Cal. Rptr. at 536.

quately be presented in a manner that lay jurors can understand.[90] Since all evidence is intended to sway a jury, high percent probability of paternity calculations should influence jury decision making. Withholding this information therefore deprives the jury of relevant facts crucial to the outcome of the case.[91]

Future uses of HL-A. The HL-A system is the subject of ongoing research in the scientific community. At present, the HL-A paternity test utilizes approximately fifty antigens located on either the A or B loci. Antigens are also being discovered on two additional loci. When all of the various HL-A antigens are discovered and classified, it has been estimated that at least 26,676 haplotypes will exist which could combine to form at least 355,817,826 genotypes.[92]

While this comment has focused upon the use of blood test information with regard to the determination of paternity, there are a host of additional medical/legal problems

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90. The adoption of a Model Jury Instruction, such as the one following, will serve as an important safeguard that will prevent putative fathers from suffering undue prejudice resulting from the admission of inclusionary blood test evidence:

PROPOSED MODEL JURY INSTRUCTION

> The percent probability of paternity for Mr. _ is based upon the presence of genetic characteristics found in his blood through the use of the HL-A paternity test. HL-A measures the frequency of finding another man with the blood characteristics of Mr. _. The percent probability of paternity calculation is based upon two assumptions. The first assumption is that all men with Mr. _'s blood characteristics have an equal chance of being the father of Ms. _'s child without regard to the frequency of sexual intercourse with the mother, the fertility of both parties, and the use of contraceptive methods or devices. The second assumption is that Mr. _ and Ms. _ had sexual intercourse together on at least one occasion during the period of conception.
>
> If you find that Mr. _ had sexual intercourse with Ms. _ on at least one occasion during the period of conception, you should weigh the percent probability of paternity calculation with all the other evidence in the case, including the credibility of the testifying witnesses.

91. Shaw & Kass, *Illegitimacy, Child Support, and Paternity Testing,* 13 HOUS. L. REV. 41, 60 (1975).

92. Bodmar & Thompson, *Population Genetics and Evolution of the HL-A System,* HLA AND DISEASE 280 (1977).

> The HLA tests will, in the course of time, become the most powerful tool for the determination of paternity or non-paternity. In fact, the probability of exclusion by HLA, will be greater than the cumulative probability of all other systems. Science has progressed to a point where ultimately in virtually every case where the accused is innocent, there will be an exclusion. And a man not excluded after complete testing will undoubtedly be the actual father of the child.

Schatkin, *supra* note 8, at § 8.04.

that admit to the use of blood grouping tests. Criminal cases involving murder, kidnapping,[93] and rape often utilize blood specimens as a means of identifying possible suspects.[94] Blood tests can also differentiate between identical and fraternal twins.[95] The HL-A's high degree of accuracy lends itself to application in these areas. Furthermore, noting the correlation between the presence of certain HL-A antigens and disease,[96] insurance companies might request future policy holders to be blood typed in order to calculate the degree of risk upon which to base premium rates.

Increased use of the HL-A blood test must carry with it high standards of quality control to assure blood typing accuracy. Joint AMA-ABA Guidelines recommend several steps be taken to properly identify the parties being tested including recordation of driver's license numbers, signatures, thumb prints, and photographs.[97] Experts must limit themselves to conducting only those tests that they are qualified to perform. Independent verification of test results is also needed. "Only if such precautions are adhered to, will the full potential of modern tests for parentage and non parentage be realized without the danger of errors and miscarriages of justice."[98] The AMA-ABA Guidelines further recommend that standards of accreditation be proposed to aid in the identification of laboratories qualified to conduct paternity testing.[99]

CONCLUSION

The Human Leukocyte Antigen system of blood testing, with its capability of generating high percent probability of paternity calculations, represents a significant scientific breakthrough. The California Legislature and judiciary should recognize the usefulness and wide acceptance of this recent scientific advancement and modify section 895 of the Evidence Code to admit inclusionary blood test results derived from HL-A paternity testing. Safeguards, such as those noted

93. Sussman, *supra* note 47, at 133.

94. Twardy, *supra* note 39, at 331-35.

95. HL-A use has also led to the discovery of one set of twins being sired by two different men. NEWSWEEK, Sept. 25, 1978, at 67.

96. SCI. AM., *supra* note 42; Schlosstein, *supra* note 42; Amos, *supra* note 42.

97. *Joint Guidelines, supra* note 43, at 281.

98. Sussman, *supra* note 47, at 130-31.

99. *Joint Guidelines, supra* note 43, at 283.

above, should be incorporated. At the same time, quality control guidelines must be set to ensure the greatest possible accuracy.

The legal profession has a responsibility to keep pace with qualitative advances in the scientific community. The use of the HL-A inclusionary blood test results in paternity actions will serve the ends of justice by replacing emotion with scientific fact.

Vera L. Sterlek and Lee M. Jacobson

EXHIBIT A

California Legislature

Assembly Committee on Judiciary

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September 17, 1980

TO: Members of the Assembly Judiciary Committee

FROM: Lettie Young

RE: Hearing on Blood Tests in Paternity Litigation

On September 22, 1980, the Assembly Judiciary Committee will hold an interim hearing on the use of blood test evidence in disputed paternity cases. The hearing is scheduled to begin at 9:30 a.m. in the Muses Room of the Space Building at the California Museum of Science and Industry, 700 State Drive, Exposition Park, in Los Angeles.

The purpose of this memorandum is to provide background information on the law governing the admissibility of blood test results to determine paternity. Descriptions of the medically approved blood testing systems are set forth in the accompanying booklets.

In cases where a man is charged with being the father of a child, the plaintiff introduces several types of evidence. The mother's testimony, which constitutes a prima facie case, is generally corroborated with evidence showing a resemblance between the alleged father and the child, actions between the parties, admissions, and other evidence tending to prove sexual intercourse. The alleged father will attempt to show that the mother had intercourse with other men near or at the time of conception. Any party in the case may request blood tests to be administered. Probably no evidence in a paternity case generates as much controversy as statistical evidence which is based on blood tests results.

The Uniform Act on Blood Tests to Determine Paternity has been adopted by nine jurisdictions, including California.[1] Section 4 of the Uniform Act provides:

> If the court finds that the conclusions of all the experts, as disclosed by the evidence based upon the tests, are that the alleged father is not the father of the child, the question of paternity shall be resolved accordingly. If the experts disagree in their findings or conclusions, the question shall be submitted upon all the evidence. If the experts conclude that the blood tests show the possibility of the alleged father's paternity, admission of this evidence is within the discretion of the court, depending upon the infrequency of the blood type.

California Evidence Code Section 895 includes all except the last sentence of Section 4. The traditional approach to Section 895 has been to permit only a showing of non-paternity. Thus, unless the tests reveal that the alleged father is excluded from the group of possible fathers, blood test evidence is inadmissible. This restriction is based on the rationale that evidence from red blood cell grouping tests if used affirmatively is highly prejudicial and irrelevant in indicating no more than the mere possibility of paternity. See Dodd v Henkel, 84 Cal. App. 3d 604 (1978), in which the court rejected the affirmative use of blood test evidence because of the limitation it perceived in Section 895.[2]

Since the adoption of the Uniform Act in California in 1953, new systems of blood testing have been developed. Recent appellate decisions have addressed the issue of determining paternity through tests based on the tissue typing of white blood cells - a test greatly different from the standard red blood cell grouping test. In Cramer v Morrison, 88 Cal. App. 3d 873 (1979), the court held that California law does not preclude use of the results of the Human Leukocyte Antigen (HLA) test to prove paternity. The Uniform Act did not, according to the Cramer court, refer to tests of the nature of the HLA; therefore, HLA test evidence could be used as affirmative proof. Moreover, in County of Fresno v Superior Court, 92 Cal. App. 3d 133 (1979), it was held that a trial

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1. The other jurisdictions are Illinois, Louisiana, New Hampshire, Oklahoma, Oregon, Panama Canal Zone, Pennsylvania, and Utah. The Uniform Act as adopted in California is found at Evidence Code Section 890 et seq..

2. Criticizing the ruling in Dodd, some commentators argue that blood tests showing non-exclusion are to be admitted among "all the evidence " and given a relative weight by the trier of fact. Their argument relies on an interpretation of other sections of the Uniform Act as adopted in California and Evidence Code Section 351, which provides, "[e]xcept as otherwise provided by statute, all relevant evidence is admissible."

court had no discretion to deny an HLA test on demand of any party or person at whose suggestion an original extended factor blood test had been ordered.

Confronted with the restriction on the use of blood test evidence, some individuals have urged the Legislature to revise the law governing the admissibility of blood test evidence. AB 1981 (Stirling) as introduced is such a proposal. In its original form, AB 1981 would, subject to Evidence Code Section 352, permit the affirmative proof of paternity through the use of evidence based upon blood tests.[3] The bill, however, would not specify which blood test or tests would be the basis for statistical evidence showing the probability of paternity. Neither would it specify a minimum percentage of probability before the evidence would be given to the trier of fact.

AB 1981 was amended to create a blood test exception to the conclusive presumption of paternity under Evidence Code Section 621. The bill was passed by the Legislature and is currently awaiting signature by the Governor. For this reason and because it deals with exclusion of an alleged father, testimony at the September 22 hearing will be confined to AB 1981 as introduced.

In order to facilitate the discussion at the hearing, witnesses have been asked to address the following general questions:

1. What are the available blood testing systems that show the probability of paternity? To what extent is each of these systems scientifically reliable as evidence of paternity?

2. Evidence Code Section 895 permits the introduction of blood test evidence if such evidence indicates the defendant is not the father of the child. If the test results show only a probability of paternity, the evidence is inadmissible. Should this restriction in Section 895 be removed?

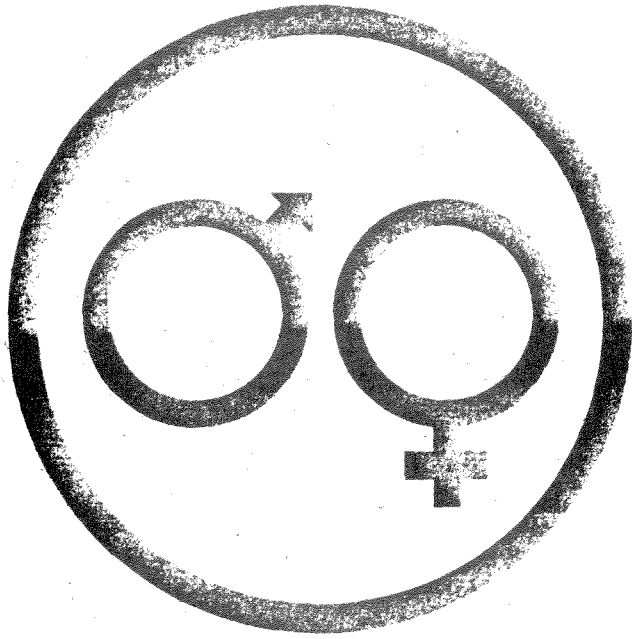
3. California appellate case law permits the use of evidence from the Human Leukocyte Antigen (HLA) test to establish paternity affirmatively. Should Section 895 be amended to conform with case law?

4. What are the social advantages or disadvantages in the unrestricted use of blood test evidence to indicate paternity?

---

3. Evidence Code 352 provides "[t]he court in its discretion may exclude evidence if its probative value is substantially outweighed by the probability that its admission will (a) necessitate undue consumption of time or (b) create substantial danger of undue prejudice, of confusing the issues, or of misleading the jury."

EXHIBIT B



Paternity Testing

Department of Pathology
Memorial Hospital Medical Center
of Long Beach

Prepared by

Paternity Testing Laboratory
Department of Pathology
Memorial Hospital Medical Center
of Long Beach

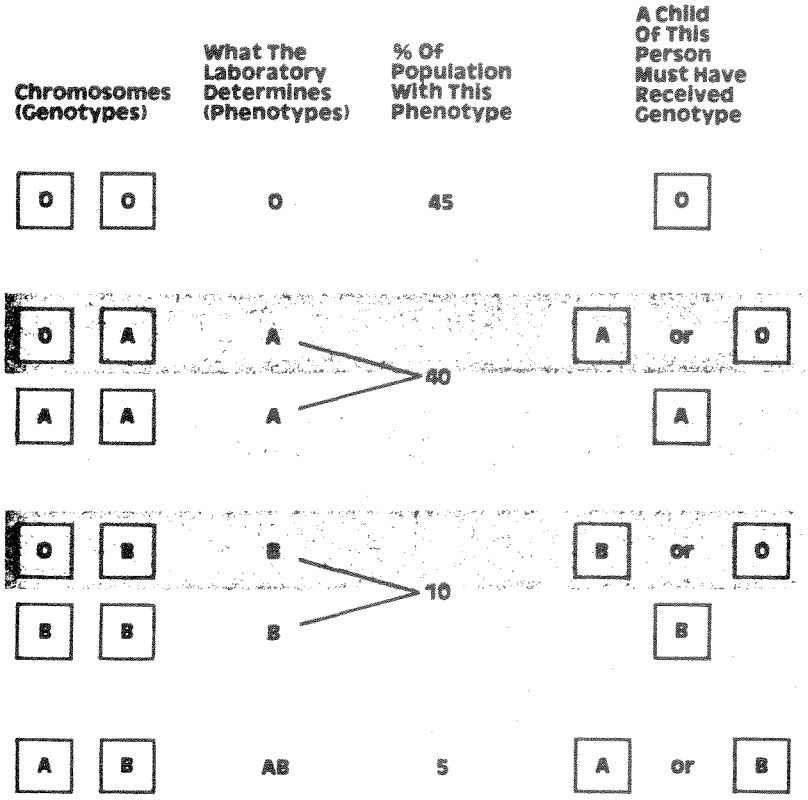
E. R. Jennings, M.D.
Director of Pathology

Paternity Testing

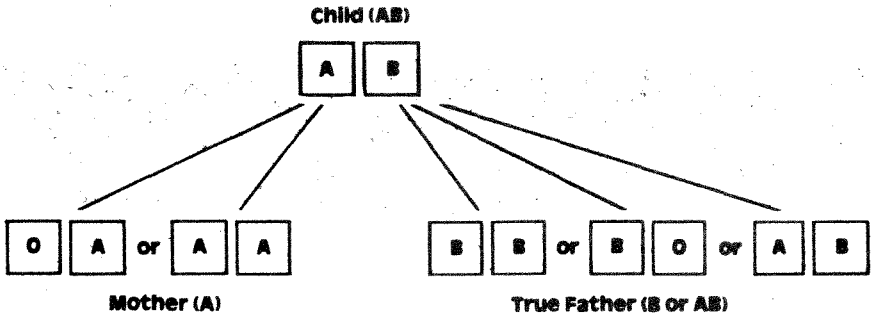
The field of paternity testing has grown substantially in the past two decades. From an original base of the group of red cell antigens, two new groups have been added: white cell antigens (HLA) and the group of blood enzymes and proteins. Despite differing techniques for the study of each group, there are basic similarities. Within a group, each system represents a particular locus (site on a chromosome) which codes for the antigens (proteins or enzymes) of that system. Each system contains two or more antigens. Each chromosome will code for a single antigen of the system. One chromosome (and therefore the information coding for one antigen) is inherited from each parent.

The particular code on each of the two chromosomes (the genotype) cannot always be exactly determined. The antigens expressed by the genes (the phenotype) are determined in the laboratory. As an example, consider the ABO system in the red cell antigen group. At this locus, each chromosome codes for either antigen A, antigen B, or no antigen (0). The table below sets out the relationships between genotype and phenotype, and illustrates the rules of inheritance of the ABO system.

GROUP: RED CELL ANTIGENS
SYSTEM: ABO



These rules of interitance can be used to derive certain exclusions. For example, a type O parent cannot give issue to a type AB child; similarly, a type AB parent cannot give issue to a type O child. Such exclusions give rise to the use of these tests in determination of paternity. For example, suppose a mother is type A (genes A and A or A and O) and her child is type AB (genes A and B):



Since the mother must have passed gene A to the child, the true (biological) father must have passed gene B. An accused man who is **not** type B or type AB would be **excluded.** Since only about 15% of the population are these types, this particular example of the ABO system would have a probability of exclusion of a falsely accused man of 85% (i.e. 85% of falsely accused men would be not of blood type B or AB, and thus would be excluded). Conversely, an accused man who is of type B or AB would be **implicated;** in comparison to a random male, the **likelihood of paternity** is about six times as great. This is a general feature of all paternity testing. Exclusions, when present, are certain; implication of paternity is never absolute, and must be expressed in statistical terms.

This example was chosen to illustrate the relationship between probability of exclusion of a falsely accused man and likelihood of paternity. In general, without knowing the phenotypes, the **a priori** probability of exclusion by the ABO system is 13-19% (depending on race). While this probability is low, combination of this system with the other systems of the red cell antigen group yields an **overall** exclusion rate of about 70%. Similar exclusion rates calculated for the other groups are given in the table.

For the group of red cell antigens and the group of blood enzymes and proteins, each system is independent of the others. For the group of white cell antigens, HLA A and HLA B are not independent (linkage disequilibrium); this must be taken into account in calculations of likelihood of paternity.

SUMMARY OF AVAILABLE METHODS OF PATERNITY TESTING

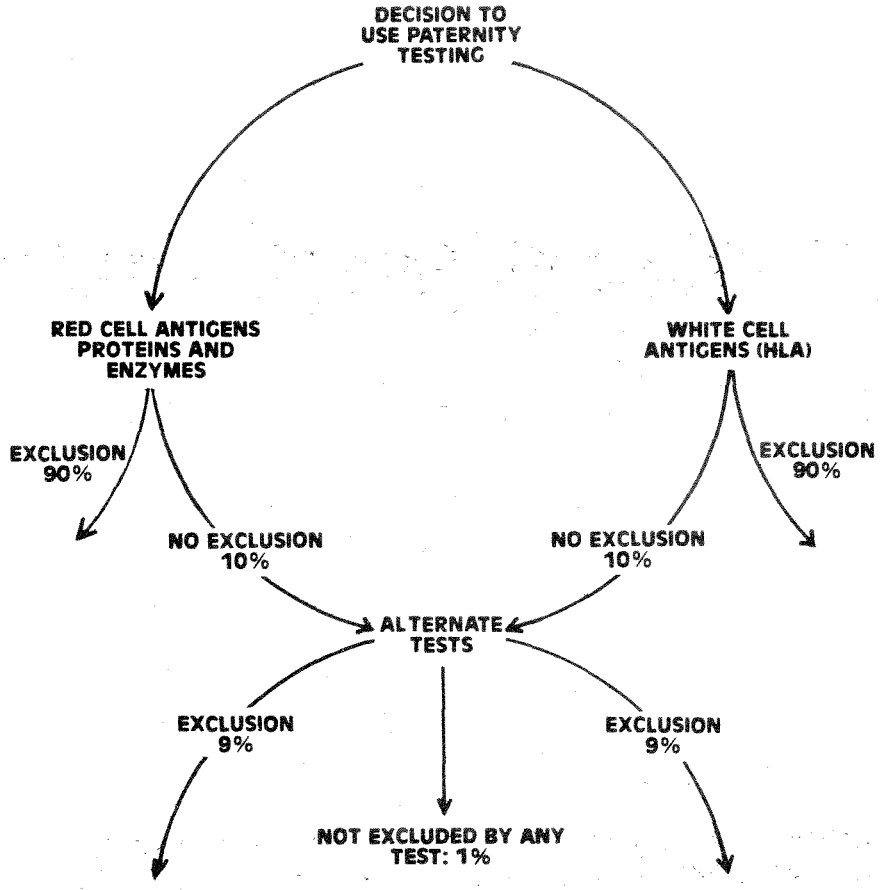
Group	Systems	Experimental Technique	Probability of Exclusion Using All Systems in Group
Red Cell Antigens	ABO, Rh, MNSs, Kell, Duffy, Kidd A & B	Agglutination	0.72
Enzymes and Proteins	AcP, AK, EsD, Gc, Hpt, PGM_1, CBC, 6-PGD, ADA	Electrophoresis	0.69
			0.91
			0.99
White Cell Antigens	HLA A, HLA B	Complement Mediated Cytotoxicity	0.91

Legal Acceptance.
The best accepted group is that of red cell antigens. The other enzymes and proteins, and white cell antigens (used widely in Europe) have recently been accepted in this country.

Efficient Use of Paternity Testing.
As the table indicates, use of **all** systems yields a probability of exclusion of 99%. However, it is not practical nor efficient to utilize all three groups routinely for the following reasons:

1. The combination of red cell antigens with enzymes and proteins has the same efficiency of exclusion as does HLA; each provides a likelihood of exclusion of slightly more than 90%.
2. The different groups of tests utilize different skills and techniques. At present, no laboratory offers all the systems.
3. The cost of testing all systems and the inconvenience of submitting specimens to several laboratories is considerable.

The above suggests that an efficient approach is to use paternity testing in a **sequential** manner, utilizing first an approach that yields a 90% or better chance of exclusion. If no exclusion is obtained, then the decision to use the alternate approach would be considered. This decision would be based, in part, on the calculated likelihood of paternity. The flow chart below indicates that, regardless of whether one starts with red cell antigens **plus** enzymes and proteins, or white cell antigens, exclusion of a falsely accused man will be made 90% of the time. If no exclusion is obtained, use of the alternate approach will result in an overall exclusion rate of 99%.



GENERAL REFERENCES:

Polesky, H. F. **Paternity Testing** (American Society of Clinical Pathology, Chicago, 1976)

Sussman, L. N. **Paternity Testing by Blood Grouping,** 2nd Ed. (Charles C. Thomas, Springfield, Ill., 1976)

Joint AMA-ABA Guidelines: Present Status of Serologic Testing in Problems of Disputed Percentage, **Family Law Quarterly X, 3;** 1976 (247-285).

For information about
Paternity Testing Services

Jeffrey Morris, M.D., Ph.D.
Immunopathology

Asa Barnes, M.D.
Immunohematology

(213) 595-2442
(213) 595-2185

EXHIBIT C

Techniques for
Effective Management of
Program Operations

TEMPO

Blood Testing

Blood testing provides an empirical tool for evaluating a question of disputed parentage. If sufficient tests are performed, and the alleged father is not excluded from consideration as a possible father, the results can be highly indicative of the likelihood or probability of paternity. Many courts permit the introduction of these "inclusionary" test results as circumstantial evidence of paternity. The purpose of this TEMPO is to acquaint the child support enforcement specialist or attorney with some basic information concerning blood testing.

In particular, a relatively unknown method of testing known as electrophoresis will be discussed. Some of its advantages include:

- transfer of blood by ordinary mail;
- testing that does not have to be done within 24 to 48 hours;
- cost that may be as little as one-half the cost of the human leukocyte antigen (HLA) test.

NATIONAL CHILD
SUPPORT ENFORCEMENT
REFERENCE
CENTER

U.S. Department of
Health and Human Services
Office of Child Support Enforcement
TEMPO No. 4
April 15, 1980

TECHNIQUES FOR EFFECTIVE MANAGEMENT OF PROGRAM OPERATIONS (TEMPO)

TEMPO 1 - Delinquency Control
TEMPO 2 - Reverse Directories
TEMPO 3 - Private Attorneys
TEMPO 4 - Blood Testing

For additional copies, contact:

National Child Support Enforcement Reference Center
6110 Executive Boulevard, 9th Floor
Beltway View Building
Rockville, Maryland 20852
(301) 443-5106

INTRODUCTION

In the United States, the rate of illegitimate births is increasing and currently exceeds 15 percent of all births. In many urban areas, the illegitimacy rate is as high as 40% and in some areas it exceeds 50%. One third of all children receiving assistance under the AFDC program are born out of wedlock. Unless paternity is established, and the father is ordered to pay child support, the entire cost for providing these children with the necessities of life falls directly upon either the mother or the taxpayer.

Support is only one consideration. The determination of paternity opens the possibility for the child to claim many other rights. Inheritance, social security, workers-disability, tort claims, and the like, which a dependent normally claims through either parent, may become available once paternity is established. Though not assured, there is even the chance of a real relationship developing between the father and the child.

Recognizing these economic realities and potential social benefits, one of the primary goals of the Child Support Enforcement program is to establish the paternity of children born out of wedlock. The administrator of a local or State IV-D office has the responsibility to see that paternity cases are processed in the most efficient manner possible. At an early stage in the paternity action, after the alleged father has been served with the petition or an administrative contact has been made, it will become apparent that some claims are seriously disputed. Whether the "father" appears to have a legitimate doubt or simply does not want to admit anything, blood testing should be encouraged. Many cases can be settled voluntarily, once the test results are in.

WHY DO BLOOD TESTING?

In order to provide a wrongly accused man the greatest opportunity of proving he is not the child's father, or to provide the strongest indication of parentage if there is no exclusion, it is essential that a comprehensive battery of blood tests be performed by a laboratory with appropriate facilities and trained personnel. With each additional blood group that is identified, another segment of the male population can be eliminated from consideration. When the components of the blood of the child and mother are identified with sufficient specificity, the possible components in the father's blood can be determined. If the alleged father's blood components match that determination, then there may be a strong indication of parentage. If possible, a blood testing laboratory should be utilized which has the capability of excluding at least nine out of ten (90%) of all wrongly accused men.

Advancements in the science of genetic identification through blood tests and tissue typing have significantly changed the nature of the paternity suit. Whereas traditionally, the mother and the accused father were engaged in a credibility contest at trial, now there are reliable scientific tests available which can resolve most disputes concerning a child's parentage. It is still impossible to prove paternity with one hundred percent certainty, but in well over ninety percent of all cases where a "father" is wrongly accused, non-paternity can be positively established. If blood testing fails to exclude the alleged father, it is often possible to compute a statistical probability or likelihood of paternity based upon the similarity of the genes.

Unless there is other conclusive evidence, blood testing should be performed as early as possible whenever paternity is vigorously denied. If there is a finding of non-paternity, the savings in administrative, legal, and judicial expenditures will be considerable for everyone concerned. Dismissal of a false claim can be accepted for its positive effect. The foremost consideration is always the actual identification of parentage, and not the imposition of a child support award.

BASIS OF BLOOD TESTING

Blood testing is based on several scientifically established principles. All individuals inherit many traits from their parents. Most characteristics are controlled by two genes, each on one of a pair of chromosomes. One of the genes is inherited from the mother and the other from the father. These inherited characteristics are known as genetic markers. Since blood components contain many of these identifiable genetic markers, blood testing is possible.

With some exceptions, if a genetic marker is found in the child, but not in the mother, it must come from the father. If an alleged father does not have such a genetic marker, he cannot be the biological father.

Knowing the variations in any one marker that are present in the mother and her child permits one to specify the range of possible variations that may be present in the biological father. If the variation observed in the alleged fatner does not fall within this range, he is excluded.

When the alleged father has all the markers required to be the father, he cannot be excluded from paternity. In this situation, he could be the father, but he also may be falsely accused by the mother and coincidentally has the required genetic markers. The chance of a random man having the required markers of the father can be calculated from known gene frequencies in a given population.

METHODS OF BLOOD TESTING

Basically there are three groups of blood tests which are now available: red cell antigens, white cell antigens (HLA) and red cell enzymes and serum proteins. Each group contains a variety of systems and each uses a different analytical technique. Each group also offers a different range of probability of exclusion based on the systems used in a particular laboratory. In fact, each laboratory that performs blood testing determines its own probability of exclusion for a falsely accused man depending upon the extent of testing performed.

RED CELL ANTIGENS

The most widely used and commonly accepted group is that of red cell antigens. An antigen is a macromolecule capable of causing an immune response. Using agglutination techniques, the common antigen systems which are tested include ABO, Rh, MNSs, Kell, Duffy, and Kidd. Since the testing technique for this group is quite simple, most laboratories or hospitals perform these tests at a relatively low cost. However, the real disadvantage of red cell antigens is the low probability of exclusion produced, ranging from 63 to 72 percent.

WHITE CELL ANTIGENS (HLA)

Four types of antigens which are present on the surface of the white blood cells have been identified; however, only three are commonly used in paternity testing. At least 20 variations of HLA type A, 30 of HLA type B and 6 variations of type C are known. The variations in each type that are present in an individual are inherited and can be determined in the laboratory. There are more than a million possible combinations. Since it is very unlikely that two unrelated individuals will possess the same combination of traits, HLA provides a very powerful tool in determining paternity. Realistically, most laboratories which do HLA testing are now using only a small proportion of the identified forms and produce exclusion probabilities which approach 90 percent or above.

ENZYMES AND PROTEINS (ELECTROPHORESIS)

In recent years, human leukocyte antigen testing (HLA) has been fairly widely used to resolve paternity disputes. Less attention has been paid to the use of other blood components known as red cell enzymes and serum proteins. The most convenient technique of studying these components is electrophoresis. The application of this technique in paternity determination has been practiced in Europe for many years and is rapidly gaining acceptance in the United States.

Electrophoresis is a process whereby charged molecules migrate through a gelatinous medium under the influence of an electric field. Variations in red blood cell enzymes and serum proteins can be identified by studying the direction and distance of their motion through the medium. It is even possible to test for several different proteins simultaneously on the same apparatus. Slight variations in the pattern of migration can be identified, and if the accused father's variations fall within a range specified by analysis of the specimens from the mother and child, the frequency with which they are found in a given gene pool can be used to determine the likelihood of paternity.

Using electrophoresis, a variety of systems are tested in the enzyme and protein group. The most common include AcP, AK, EsD, Gc, Hp, PGM, Bf, 6-PGD, ADA, GLO, GPT, and Tf. These letters are abbreviations of the names of the proteins. Based on the systems used, the probability of exclusion using electrophoresis ranges from 70-85 percent. Used in conjunction with the red cell antigen group, the probability of obtaining an exclusion of a wrongly accused man may exceed 95 percent.

ADVANTAGES OF ELECTROPHORESIS

Analysis of the serum proteins and enzymes which are found on the red blood cells has several advantages over HLA testing which uses the white blood cells. To begin with, the red blood cells are hardier. They will withstand greater extremes of heat and cold which the blood specimens may be subjected to in transit. This is particularly important if the blood is to be shipped by commercial carrier and especially if they are shipped by mail. Another major advantage is that testing does not have to be performed within twenty-four hours, as is required with HLA. This can be extremely important when the parties cannot have their blood samples drawn at the laboratory where the tests will be performed.

HLA tends to be more expensive than extended factor red blood cell analysis. HLA laboratories commonly charge $400, or more, for three individuals, whereas comparable serum protein and enzyme analysis is available at half that cost. The difference is due, in part, to the scarcity of the antisera which are essential to perform the HLA testing. The major source of antisera, the National Institute of Health, actually discourages the use of this precious commodity for purposes other than organ transplantation, disease identification, and pure research.

With the ever growing demand for blood testing in paternity cases, fostered by the gradual acceptance of test results by the courts, it is doubtful that HLA laboratories will be able to keep expanding at the required rate. Those laboratories which are equipped to do electrophoretic testing may fill the gap, and HLA testing might be reserved for the exceptional cases where red blood cell analyses are inconclusive.

SUMMARY OF AVAILABLE METHODS OF PATERNITY TESTING*

Group	Systems	Experimental Technique	Probability of Exclusion Using All Systems In Group
Enzymes and Proteins	AcP, AK, EsD, Bf Gc, Hp, PGM, Tf GPT, 6-PGD, ADA	Electrophoresis	.70-.85
Red Cell Antigens	ABO, Rh, MNSs, Kell, Duffy, Kidd A & B	Agglutination	.63-.72
White Cell Antigens	HLA A, HLA B	Complement Mediated Cytotoxicity	.85-.91

.91-.97

.91-.99

.99+

As the table indicates, use of all systems yields a probability of exclusion of 99%. However, it is not practical nor efficient to utilize all three groups routinely for the following reasons:

1. The combination of red cell antigens with enzymes and proteins has substantially the same efficiency of exclusion as the combination of red cell antigens with HLA; each provides a likelihood of exclusion of greater than 90%.

2. The different groups of tests utilize different skills and techniques. At present, very few laboratories offer all the systems.

3. The cost of testing all systems and the inconvenience of submitting specimens to several laboratories is considerable.

The above suggests that an efficient approach is to use paternity testing in a sequential manner, utilizing first an approach that yields a 90 percent or better chance of exclusion. Regardless of whether one starts with red cell antigens plus enzymes and proteins, or white cell antigens (HLA), exclusion of a falsely accused man will be made 90% of the time. If the tests used indicate a sufficiently high probability of paternity, at least 80%, no further testing may be required. If the results are inconclusive, it may be desirable to employ further analysis. Use of all tests will result in an overall exclusion rate of 99%.

* This summary is taken in large part from a pamphlet prepared by Paternity Testing Laboratory, Department of Pathology, Memorial Hospital Medical Center of Long Beach, California, and reprinted with the permission of Jeffrey Morris, M.D., Ph.D. No official support or endorsement of the laboratory or any one blood testing group, system or technique by the Office of Child Support Enforcement, DHEW is intended or should be inferred.

IDENTIFICATION OF THE PARTIES AND CHAIN OF CUSTODY OF THE BLOOD SPECIMENS

Whatever tests are performed in the laboratory, they will be useless if adequate safeguards are not maintained to assure proper matching of the test results with the parties to the paternity dispute. The first point of concern is identification of the individuals before their blood is drawn.

It may be most convenient to have everyone involved appear at the same time, identify each other, and witness the drawing, labeling and sealing of the blood specimens. If this cannot be arranged, then the laboratory must exercise special care to identify the parties. Most States now have photograph identification drivers licenses which can be used for this purpose. A better procedure is to photograph the alleged father when he appears to have his blood drawn. Use an "instant-developing" photo process and request that the picture be signed before a witness. When the mother appears at a subsequent time, ask her to signify identification of the man by initialling his picture. She should also be photographed with the child and should sign their names on the picture's back side. Thumbprints are used in some laboratories to record the identities of the mother and the accused father. A footprint may be made of the child.

Chain of custody refers to the possession and control of the blood samples from the time they are drawn until the time the final test is performed. Meticulous care must be exercised to insure that there is no confusion of identity of the specimens. When selecting a laboratory, be sure to ask what precautions will be taken as standard procedure to guarantee there will be no mix-ups.

This is an area where simple attention to detail can remove any reasonable doubt concerning the care and handling of the blood samples. If there is any question at all, it should be answered before the blood is drawn. It is a common practice for the attorneys for both parties to agree in advance that there will be no challenge made to the chain of custody.

RESULTS OF ANALYSIS - INTERPRETATION AND SUBSTANTIATION

If a definite finding of non-paternity appears early in the testing procedure, it is not necessary to perform the full battery of blood analyses. The critical exclusionary system should be double-checked, however, using different reagents, and, if feasible, different laboratory personnel. A thorough laboratory may conduct additional tests in any event, seeking to obtain corroborating proof of the exclusion. Since the finding of non-paternity is, in effect, the conclusion of the case, it is extremely important that every chance for error should be minimized. When selecting a laboratory, inquire carefully as to its procedures for duplicate testing and other means of quality control.

If extended factor analysis does not yield a finding of non-paternity, the test results should be reviewed to determine whether there is a statistical likelihood of paternity. Since each characteristic identified in the child's blood must have come from one of the parents, a genetic marker not found in the mother must have been contributed by the father. If the alleged father's blood is compatible with that of the child, it is possible that he may be the father. With a knowledge of the frequency of occurrence of various blood types in the community at large, it is possible to indicate whether the possibility of paternity is greater than random selection might indicate. It is a relatively simple matter to compute a probability percentage indicating likelihood of paternity in a given case. A laboratory familiar with these computations and willing to include them as a part of the blood test report should be sought.

GENERAL CONSIDERATIONS

The IV-D agency should strive to work in harmony with the blood testing laboratory. The needs of each organization should be understood by both. The laboratory will have forms to prepare and procedures which must be followed. (See examples.) Be sure the parties understand how important it is that they appear on time for blood sampling. The parties should know in advance what identification should be presented. Make certain that every detail of payment for the tests is worked out before the blood is drawn.

Whenever possible, the parties should stipulate, in writing, as to the evidentiary use which will be made of the blood test report before analysis is performed. (See sample stipulation.) At the very least, they should agree that the chain of custody of the blood samples will not be challenged. If there is any doubt concerning this important link, it should be removed at the beginning.

Since blood testing is most likely to benefit the wrongly accused man, the defendant usually advances all costs of the testing. Sometimes an agreement is made to reimburse him if there is a finding of non-paternity. The IV-D agency may occasionally advance costs, or a portion of the costs, if there is a stipulation in writing permitting the use of inclusionary test results as evidence of paternity. The defendant may be required to reimburse the IV-D agency if paternity is adjudicated.

EXPERT TESTIMONY

In most States, extremely few paternity cases go to trial. Blood test reports can be particularly useful in encouraging a negotiated settlement. In the estimated five or six percent of disputed cases which must finally be tried, it is highly advantageous to have medical evidence available showing the likelihood of paternity based upon genetic resemblance of the accused father and the child.

It is not necessary to place the expert witness on the stand, even in those cases which ultimately go to court. If the parties have stipulated in advance to the admissibility of the test report, it can simply be offered for the court's consideration. In other cases, the evidence may be admitted with supporting affidavits, oral depositions, or written interrogatories. To the extent that the medical personnel can be spared the inconvenience of having to appear and testify in court, their future cooperation can be assured.

If there is any legitimate doubt concerning any part of the results of blood testing, or their interpretation, the best course is to duplicate the procedures in another laboratory. The party challenging the results of the first test should usually be expected to pay the costs of the second tests.

SAMPLE - BLOOD TEST STIPULATION

IN THE DISTRICT COURT OF THE STATE OF IOWA

IN AND FOR COUNTY

STATE OF IOWA, EX REL.,

_____ Complainant,

vs.

_____ Defendant.

NO._____

STIPULATION REGARDING BLOOD TESTS

COME NOW the parties to this action, and hereby stipulate and agree to the following:

1. The parties will present themselves, and Complainant will present the child for whom a paternity adjudication is being sought herein, at a time and place to be arranged for the purpose of drawing blood samples.

2. Said blood samples shall be forwarded to the Minneapolis War Memorial Blood Bank for analysis to determine whether or not the Defendant could be the father of the child named in the Paternity Complaint.

3. Defendant shall pay all costs of blood analysis.

4. Test results shall be furnished to both parties as soon as available.

5. If said analysis shall exclude Defendant from being a possible father of the child, then this action shall be dismissed.

6. Neither party will challenge the chain of custody of the blood samples, and the test results may be offered as evidence and admitted without objection for whatever probative value they may have.

7. If the test results are disputed, the Court, upon reasonable request of either party, may order additional testing at the expense of the requesting party.

8. In the event that he is not excluded as a possible father of the child in question, Defendant agrees:

Date:_____

_____

_____
Attorney for Defendant

Date:_____

_____

_____
Attorney for Complainant

* The Iowa stipulation is included as an example only. Each State or jurisdiction should develop its own stipulation based on its procedures, needs and statutes.

SAMPLE - INSTRUCTIONS FOR SUBMITTING BLOOD SPECIMENS

INSTRUCTIONS FOR SUBMITTING BLOOD SPECIMENS TO THE MINNEAPOLIS WAR MEMORIAL BLOOD BANK FOR PATERNITY EXCLUSION STUDIES

1. IDENTIFICATION: Prior to drawing blood obtain some type of identification. Preferably a picture ID such as a driver's license. We ask that you write the number of the ID on the attached form and indicate if it had a picture on it. (At War Memorial we obtain a thumb print, a Polaroid picture-signed as well as a drivers license. The women then identify the men by their picture.

2. TRANSFUSIONS: Do not draw blood if individual has had any blood transfusion within the past three months.

3. AGE OF CHILD: The child should preferably be four months of age or older.

4. SPECIMENS: Draw 20cc of Anticoagulated blood in yellow stoppered ACD tubes (A minimum of 4 cc on child).

5. LABELS: Attach a label on tube with the name of person, relationship to child (alleged father or mother), date of drawing and initials of person drawing sample. DO NOT WRITE DIRECTLY ON TUBE. Mislabeled tubes are discarded.

6. REFRIGERATE: Samples must be refrigerated until mailed.

7. VERIFICATION: The person drawing the blood must fill in all information requested on the attached form and sign his or her name to verify that the information is correct and blood is from the person named on form.

8. Place tubes into Styrofoam mailer, insert mailer and form into pre addressed sleeve. DO NOT WRAP FORM AROUND TUBES. Send all specimens via first class mail.

   a). Extremes of heat or freezing ruins samples so mail at inside mailbox near time of pickup.
   b). Specimens should not be mailed before holidays or weekends as they may sit in a post office an extra day. They will be preserved longer if kept in a refrigerator in your office for an extra day.

9. PAYMENT: PAYMENT IS TO BE SENT WITH THE BLOOD SPECIMENS UNLESS PRIOR ARRANGEMENTS HAVE BEEN MADE. Our charge for the testing of specimens is per individual.

10. MAIL SPECIMENS TO: Minneapolis War Memorial Blood Bank
    2304 Park Avenue South
    Minneapolis, Minnesota 55404

11. If you have any questions, please call the Blood Bank. Area Code (612) 871-3300 ext. 22.

* Reprinted with permission of Dr. Polesky of the Minneapolis War Memorial Blood Bank. The instructions apply to that laboratory and are included for illustration purposes only. Each blood testing facility will have its own instructions and procedures for identifying the parties, preserving the blood samples and payment. No official support or endorsement of the laboratory that developed these instructions by the Office of Child Support Enforcement, DHEW is intended or should be inferred.

SAMPLE - BLOOD TEST FORM

BEFORE COMPLETING THIS FORM - CAREFULLY READ INSTRUCTIONS

THIS FORM TO ACCOMPANY BLOOD SAMPLES SUBMITTED TO MINNEAPOLIS WAR MEMORIAL BLOOD BANK FOR PATERNITY TESTING.

This is to certify that proper identification was taken before drawing blood samples:

_____ _____
(Signature of person drawing blood) date

_____
(Print name of person drawing blood)

BLOOD BANK USE ONLY

	Date rcv'd	Comment
AF		
M		
C		

REPORTS SHOULD BE SENT TO:
Alleged Father's Representative

Mother's Representative

PLEASE NOTE: Even if you are submitting blood, at this time, on only one or two individuals please list all names on this form.

ALLEGED FATHER

NAME _____ RACE White____Black____ Other____ Specify____

ADDRESS_____ BIRTHDATE_____

CITY/STATE/ZIP CODE_____

Blood transfusion in past three months? Yes___No___

Driver's License : #_____ Picture Yes___No___

MOTHER

NAME_____ RACE White____Black____ Other Specify_____

ADDRESS_____ BIRTHDATE_____

CITY/STATE/ZIP CODE_____

Blood transfusion in past three months? Yes___No___

Driver's License : #_____ Picture Yes___No___

CHILD

NAME_____ RACE White____Black____ Other Specify_____

BIRTHDATE_____ SEX_____

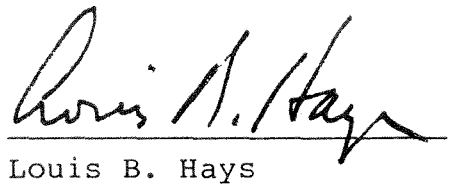
Blood transfusion in past three months? Yes____No____

Rev 7-79

* Reprinted with permission of Dr. Polesky of the Minneapolis War Memorial Blood Bank. No official support or endorsement of the form or of the laboratory by the Office of Child Support Enforcement, DHEW is intended or should be inferred.

Blood testing is only one aspect of paternity determination. It is still impossible to say with complete certainty, on the basis of blood tests alone, that a certain man is the father of a certain child. When taken with other evidence, however, the inclusionary blood test report can turn the action into a highly objective proceeding.

For additional information regarding blood testing as well as a list of laboratories performing HLA or Red Cell Enzyme and Serum Protein testing, please contact the National Child Support Enforcement Reference Center. The Reference Center may be contacted in writing or at (301) 443-5106.



Louis B. Hays
Deputy Director
Office of Child Support
Enforcement

EXHIBIT D

Techniques for
Effective Management of
Program Operations

TEMPO

Blood Testing Laboratories

The blood testing laboratory plays an important role in the resolution of paternity disputes. An effective paternity determination program requires a working relationship with a laboratory that does genetic testing. This TEMPO suggests criteria for selecting a blood testing laboratory. Included in this TEMPO are two lists of laboratories which perform paternity testing with a high probability of exclusion.

NATIONAL CHILD
SUPPORT ENFORCEMENT
REFERENCE
CENTER

**U.S. Department of
Health and Human Services**
Office of Child Support Enforcement
TEMPO No. 9
July 1, 1980

TECHNIQUES FOR EFFECTIVE MANAGEMENT OF PROGRAM OPERATIONS (TEMPO)

TEMPO 1 - Delinquency Control
TEMPO 2 - Reverse Directories
TEMPO 3 - Private Attorneys
TEMPO 4 - Blood Testing
TEMPO 5 - Management by Objectives
TEMPO 6 - Child Support Brochures
TEMPO 7 - Cooperative Agreements
TEMPO 8 - Debt Set-Off Collection Procedures
TEMPO 9 - Blood Testing Laboratories

For additional copies, contact:

National Child Support Enforcement Reference Center
6110 Executive Boulevard, 9th Floor
Beltway View Building
Rockville, Maryland 20852
(301) 443-5106

Blood Testing Laboratories

Blood testing provides the only truly objective evidence available for resolution of paternity disputes. It is a crucial element for any paternity determination program. The Child Support Enforcement agency should strive to establish a good working relationship with the blood testing laboratory. This means getting to know the personnel and understanding their basic procedures. If the blood testing laboratory is aware of your agency's requirements and you understand their procedures, most potential problems can be anticipated and avoided. Working together, the IV-D agency and the blood testing laboratory can greatly enhance a child's opportunity for having paternity accurately determined.

This TEMPO is a direct follow-up to TEMPO #4, "Blood Testing," which discusses various testing systems and legal considerations. You are encouraged to read that TEMPO which is available from the Reference Center.

This TEMPO suggests some factors for consideration when selecting a blood testing laboratory. This TEMPO also includes two lists of laboratories which perform genetic testing with a high probability of excluding a wrongly accused man.

Factors To Be Considered When Selecting A Laboratory

As with the purchase of any service or commodity, a number of factors should be carefully investigated and considered before contracting with a blood testing laboratory. The foremost consideration is whether the laboratory performs a sufficiently detailed series of tests to exclude most wrongfully accused men. Blood testing laboratories which perform electrophoretic testing of red cell enzymes and serum proteins and laboratories which test human leukocyte antigens (HLA) provide an exclusion rate of at least 90%, whereas laboratories which test only red cell antigens exclude approximately 70%. There are other considerations. The laboratory should:

- be able to handle the required volume,
- have effective quality control procedures,
- provide clear reports indicating the likelihood of paternity if there is no exclusion,
- have an expert prepared to testify in selected cases,
- provide service at a reasonable cost.

It may be worthwhile for you to consider several laboratories before making a selection.

At the outset, you should inform the laboratory director or supervisor of the needs of your program. How many paternity cases do you handle each year? How many blood tests do you expect you will need? What type of testing will you require: red cell antigens, red cell enzymes and serum proteins, human leukocyte antigens (HLA)? Will the IV-D agency be paying for all, some, or none of the tests?

It is not necessary that the testing be done within your particular State. Blood samples may be drawn in a local hospital or laboratory and then shipped to the laboratory which will do the testing. Remember that HLA testing must begin within twenty-four to forty-eight hours after the blood is drawn. Time is not quite so critical for red cell testing (antigens, serum proteins, and enzymes). The red blood cells will also withstand considerable extremes of temperature, so blood samples generally may be shipped by ordinary mail.

The laboratory may want you to notify the parties when testing is scheduled, and may even want you to arrange for drawing the blood specimens to be forwarded to the laboratory for testing. It is a good idea to call the parties, or the defendant's attorney the day before the tests are scheduled to remind them of their appointment. Many laboratories performing HLA testing require a non-refundable deposit before the blood is drawn. If the parties fail to appear, the deposit is forfeited. If transportation is a problem, as may be the case for some AFDC clients, your office may wish to assume responsibility for getting the mother to the laboratory.

Inquire carefully into the laboratory procedures for identifying the parties, labeling and sealing blood specimens, and avoiding any mix-ups during the blood analysis. This "chain of custody" protection is one of the links in the testing process most frequently challenged. Make sure that adequate precautions are taken at every stage of the proceeding.

The IV-D agency may be asked to help with identification of the parties. You should know what is required so that you can advise the parties to present their driver's licenses or birth certificates at the time of testing. If all of the individuals are expected to appear and identify each other at the time blood samples are drawn, your office may find it advisable to have a representative present. The client may feel more comfortable if she doesn't have to confront the accused father alone. Even if the parties have their blood drawn at separate times, and photographs or fingerprints are taken for identification purposes, it may be appropriate to accompany the client to the lab to ensure that she is on time for her appointment.

Since the finding of exclusion means the end of the case, and it is likely that no further paternity determination efforts for the child will be made, it is extremely important that there be no mistakes. In addition to knowing the basic tests which are routinely administered, it is important to have some rudimentary knowledge of a laboratory's quality control precautions. Are test results double-checked? If there is an exclusion, are the critical tests repeated? Are different reagents used? If possible, will the tests be repeated by different laboratory technicians? Does the laboratory seek to obtain additional proof of non-paternity even after one test shows an exclusion?

Know in advance how long it will take before a report will be issued. Delays of several weeks or even months are not uncommon. Some tests take several days to perform, and some laboratories have a backlog of cases and other work to do in addition to paternity testing. If the average turnaround time is known, and the parties can expect the report by a certain date, anxiety may be relieved. Complete red cell testing (including enzymes and serum proteins) may take slightly longer than HLA. On the other hand, red cell testing requires less blood than HLA testing. Consequently, the child may have a sample drawn at an earlier age. Sufficient blood for red cell testing can usually be drawn from an infant no more than a few months old, whereas HLA testing may dictate that no blood will be drawn until the child is at least one year old.

If there is a possibility of paternity based on the results of blood testing, and if the report indicates a high probability of paternity, may the tests be used in court as circumstantial evidence? Generally, this issue is settled by stipulation of the parties before they submit to having blood samples drawn. In some cases, however, it may be necessary to have the doctor supervising the laboratory explain the testing procedures and interpret the results under oath. Does your laboratory have an expert willing to follow through in such select cases? What is the fee for testifying? Can depositions be taken instead? How often is it anticipated that this service may be required?

You should establish clear arrangements for paying the laboratory before testing begins. If the paternity defendants will be paying for blood testing, either their share or the entire fee, the laboratory may want you to ensure that the money is available in advance. Personal checks, or even attorneys' trust account drafts may not be acceptable. Make sure that everyone is aware of the rules and abides by them; serious disagreements may ensue if payment is not timely.

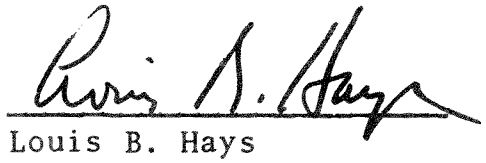
Lists of Laboratories

Attached are two lists of laboratories which have been contacted by the Office of Child Support Enforcement and a summary of information obtained from their representatives. The first list on pages 5 through 12 includes 15 laboratories which perform electrophoretic testing of red cell enzymes and serum proteins as well as testing red cell antigens. Some of these laboratories also perform human leukocyte antigen (HLA) tests. The second list on pages 14 through 21 is compiled largely of laboratories performing human leukocyte antigen (HLA) testing, exclusively or in conjunction with red cell antigen tests. Laboratories performing only red cell antigen testing which yields a probability of exclusion of approximately 70% of the wrongly accused men are not included on either list but information on many of these laboratories may be obtained by contacting the Reference Center.

The indication of fees charged by each laboratory reflects information obtained during April 1980. Be careful when comparing prices. Some laboratories charge on a per person basis. Others charge a single fee for 3 persons. The fee may or may not include the cost of the report.

Laboratories are listed alphabetically by State and city. No official support or endorsement of the laboratories listed in this document by the Office of Child Support Enforcement is intended or should be inferred. These lists will be periodically updated so that any laboratory not included may be added in the future.

TEMPO No. 4, "Blood Testing," should be consulted for detailed information concerning specific tests and legal considerations. For more information, including copies of TEMPO #4, contact the National Reference Center, Office of Child Support Enforcement, 6110 Executive Blvd., Rockville, Maryland 20852, (301) 443-5106.



Louis B. Hays
Deputy Director
Office of Child Support
Enforcement

LABORATORY

Dr. Jeffrey W. Morris
Memorial Hospital Medical Center Blood Bank
2801 Atlantic Avenue
Long Beach, California 90801
(213) 595-2442

Type of Tests Performed

Red Cell Antigens
Red Cell Enzyme and Serum Protein
Human Leukocyte Antigens (HLA)

Probability of Exclusion

Red Cell Antigens + Red Cell Enzyme and Serum Protein 89-96%
Red Cell Antigens + HLA 94-97%
All Systems 99+%

Turnaround Time

3 weeks

Fees

$300 for 3 persons for all systems including HLA

Report

Report includes a probability of paternity.

LABORATORY

Dr. R. S. Sparks
University of California
Department of Medicine
School of Medicine
Center for Health Sciences NW 35
Los Angeles, California 90024
(213) 825-5720

Type of Tests Performed

Red Cell Antigens
Red Cell Enzymes and Serum Protein

Probability of Exclusion

Red Cell Antigens + Red Cell Enzyme and Serum Protein 95%

Turnaround Time

3 weeks

Fees

$750 for 3 persons

Report

Report includes a probability of paternity.

LABORATORY

Dr. Byron Myhre
Blood Grouping Laboratory of the PSA
1124 W. Carson Avenue
Torrance, California 90502
(213) 533-2258 or 3870

Type of Testing Performed

Red Cell Antigens
Red Cell Enzyme and Serum Protein

Probability of Exclusion

Red Cell Antigens + Red Cell Enzyme and Serum Protein 92%

Turnaround Time

3-5 days

Fees

$350 for 3 persons

Report

Report includes the percentage of inclusion or an explanation of the exclusion.

LABORATORY

Dr. R. E. Gaensslen & Dr. H. C. Lee
University of New Haven Forensic Science Laboratory
University of New Haven
West Haven, Connecticut 06516
(203) 934-6321

Type of Tests Performed

Red Cell Antigens
Red Cell Enzyme and Serum Protein

Probability of Exclusion

Red Cell Antigens 70%
Red Cell Enzyme and Serum Protein 90%

Turnaround Time

1 week

Fees

$500 for 3 persons

Report

A probability of paternity can be provided.

LABORATORY

Dr. Chang Ling Lee
Charles Hyman Blood Center
Mt. Sinai Hospital Medical Center
2746 West 15th Street
Chicago, Illinois 60608
(312) 542-2231

Type of Tests Performed

Red Cell Antigens
Red Cell Antigens + HLA
Red Cell Antigens + HLA + Red Cell Enzymes and Serum Protein

Probability of Exclusion

Red Cell Antigens 70%
Red Cell Antigens + HLA 95%
Red Cell Antigens + HLA + Red Cell Enzyme and Serum Protein 99%

Turnaround Time

2 weeks

Fees

$50 per person for Red Cell Antigens
$125 per person for Red Cell Antigens + HLA
$200 per person for Red Cell Antigens + HLA + Red Cell Enzyme and Serum Protein

Report

Report includes the systems in which exclusions are found as well as a probability of paternity.

LABORATORY

Dr. P. Michael Conneally
Department of Medical Genetics
Indiana University Medical Center
1100 W. Michigan Street
Indianapolis, Indiana 46223
(317) 264-2241

Type of Tests Performed

Red Cell Antigens + Red Cell Enzyme and Serum Protein

Probability of Exclusion

93% for Caucasians
84% of Blacks

Turnaround Time

2 weeks

Fees

$300 for 3 persons (Fee includes report)

Report

Report includes the system(s) in which exclusions are found as well as a probability of paternity.

LABORATORY

Dr. Wilma Bias
Immunogenetics Laboratory
The Johns Hopkins Medical School
720 Rutland Avenue
Baltimore, Maryland 21205
(301) 955-3600

Type of Tests Performed

Red Cell Antigens
Red Cell Enzyme and Serum Protein
Human Leukocyte Antigens (HLA)

Probability of Exclusion

All systems 99% in Caucasians
98% in Blacks

Turnaround Time

3 weeks

Fees

$1100 for 3 persons for all systems

Report

Report includes a probability of paternity.

LABORATORY

Dr. Dale Kessler
Blodgett Memorial Hospital Medical Center
1840 Wealthy Street S.E.
Grand Rapids, Michigan 49506
(616) 774-7722

Type of Tests Performed

Red Cell Antigens
Red Cell Enzyme and Serum Protein
Human Leukocyte Antigens (HLA)

Probability of Exclusion

Red Cell Antigens & HLA
94.45% in Caucasians
92.67% in Blacks
All Systems
99.25% in Caucasians
99.05% in Blacks

Turnaround Time

2 weeks for exclusion
6-8 weeks if not excluded

Fees

$165 for 3 persons for Red Cell Antigens
$135 for 3 persons for Red Cell Enzyme and Serum Protein
$270 for 3 persons HLA

Report

Report includes a probability of exclusion and paternity index.

LABORATORY

Dr. Henry Gerschwitz
National Legal Labs, Inc.
2248 E. Mt. Hope
Okemos, Michigan 48864
(517) 349-3890

Type of Tests Performed

Red Cell Antigens + Red Cell Enzyme and Serum Protein

Probability of Exclusion

91% for Caucasians
90% for Blacks

Turnaround Time

2 weeks

Fees

$200 for 3 persons (does not include drawing of blood)

Report

A calculation of probability of paternity is available for an additional fee.

LABORATORY

Dr. H. F. Polesky
The Minneapolis War Memorial Blood Bank
2304 Park Avenue
Minneapolis, Minnesota 55404
(612) 871-3300

Types of Tests Performed

Red Cell Antigens + Red Cell Enzyme and Serum Protein
Human Leukocyte Antigens (HLA)

Probability of Exclusion

Red Cell Antigens + Red Cell Enzyme and Serum Protein 94-97%

Turnaround Time

5-6 weeks

Fees

$70 per person for Red Cell Antigens + Red Cell Enzyme and Serum Protein
$90 per person for HLA

Report

Report includes the systems in which exclusions are found as well as a probability of paternity.

LABORATORY

Dr. F.H. Allen
Laboratory for Genetic Services
New York Blood Center
310 East 67th Street
New York, New York 10021
(212) 570-3232

Type of Tests Performed

Red Cell Antigens
Red Cell Enzyme and Serum Protein
Human Leukocyte Antigens (HLA)

Probability of Exclusion

Red Cell Antigens 77%
Red Cell Enzyme 55%
Serum Proteins 75%
HLA 90%
All systems 99+%

Turnaround Time

1 week for Red Cell Antigens + HLA
6 weeks if all tests are performed

Fees

$450 for 3 persons for Red Cell Antigens + HLA
$300 for 3 persons for Red Cell Enzyme and Serum Protein

Report

Report includes a tabular presentation of results and a probability of paternity.

LABORATORY

Dr. L. R. Weitkamp
University of Rochester
Genetic Markers Laboratory
601 Elmwood Avenue
Rochester, New York 14642
(716) 275-2509

Type of Tests Performed

Red Cell Antigens
Red Cell Enzyme and Serum Protein
Human Leukocyte Antigens (HLA)

Probability of Exclusion

Red Cell Antigens 50-60%
Red Cell Antigens + HLA 90+% in Caucasians
Red Cell Antigens + Red Cell Enzyme and Serum Protein 89%
All Systems 99%

Turnaround Time

1 week

Fees

$275 for 3 persons for Red Cell Antigen + HLA
$175 for 3 persons for Red Cell Enzyme + Serum Protein

Report

Probability of paternity available if requested.

LABORATORY

Dr. E. W. Lourien
Linkage Laboratory
University of Oregon Health Services Center
707 S.W. Gaines Rd. CDRC 2258
Portland, Oregon 97201
(503) 225-8279

Type of Tests Performed

Red Cell Antigens + Red Cell Enzyme and Serum Protein

Probability of Exclusion

85-95%

Turnaround Time

2 weeks

Fees

$75 per person

Reports

Report includes the system(s) in which exclusions are found as well as a probability of paternity and paternity index.

LABORATORY

Dr. J.P. Abbott
Abbott Clinical Laboratory
603 Medical Towers
1709 Dryden
Houston, Texas 72030
(713) 797-0567

Type of Tests Performed

Red Cell Antigens
Red Cell Enzyme and Serum Protein
Human Leukocyte Antigens (HLA)

Probability of Exclusion

Red Cell Antigens 75%
Red Cell Antigens + Red Cell Enzyme and Serum Protein 85%
All Systems 95%

Turnaround Time

10 days for all systems

Fees

$450 for 3 persons for Red Cell Antigens
$700 for 3 persons for Red Cell Antigens + Red Cell Enzyme and Serum Protein
$1500 for 3 persons for Red Cell Antigens + Red Cell Enzyme and Serum Protein + HLA

Reports

Reports include a probability of paternity.

LABORATORY

Dr. A. A. Hossaini
Family Grouping and Immunogenetics
Medical College of Virginia
Box 451
Richmond, Virginia 23298
(804) 786-0655

Type of Tests Performed

Red Cell Antigens
Red Cell Antigens + Human Leukocyte Antigens (HLA)
Red Cell Enzyme and Serum Protein

Probability of Exclusion

Red Cell Antigens + Red Cell Enzyme 90%
Red Cell Antigens + HLA 90-98%
Red Cell Antigens + Red Cell Enzyme and Serum Protein 95%

Turnaround Time

1 week

Fees

$250 for 3 persons for Red Cell Antigens
$350 for 3 persons for Red Cell Antigens + Red Cell Enzyme
$300 for 3 persons for HLA
$450 for 3 persons Red Cell Antigens + HLA
Fees not available for Serum Protein at this time.

Report

The report includes a table of the results, interpretation of the results, and a probability of paternity.

The following is a list of laboratories which perform human leukocyte antigen (HLA) testing, either exclusively or in conjunction with red cell antigen test. No official support or endorsement of the laboratories listed in this document by the Office of Child Support Enforcement is intended or should be inferred.

The blood testing group codes are as follows:

HLA	= Human Leukocyte Antigens
RBC-A	= Red Cell Antigens
RBC-E	= Red Cell Enzymes
Se.Pr.	= Serum Protein

	GROUPS	FEES
Ron T. Acton, Deputy Director DRTC-Tissue Typing Laboratory University of Alabama UAB, University Station Birmington, Alabama 35294 (205) 934-2362	HLA, RBC-A	$100 per person
Robert C. Williams Blood Systems Central Laboratory 6220 East Oak Street Scottsdale, Arizona 85257 (602) 949-1412	HLA, RBC-A	$625 for 3 persons
Dr. P. Terasaki University of California Department of Surgery 1000 Veteran Avenue Los Angeles, California 90024 (213) 825-7651	HLA	$125 per person
Julita A. Fong, M.D. Laboratory Director Fong Diagnostic Laboratory 7224 Florin Mall Drive Sacremento, California 95823 (916) 421-4167	HLA, RBC-A	$125 per person (HLA) $40 per person (RBC-A)
Herbert A. Perkins, M.D. Irwin Memorial Blood Bank 270 Masonic Avenue San Francisco, California 94118 (415) 567-6400	HLA, RBC-A	$75 per person (RBC-A) $125 per person (HLA)
Stanford University Medical School Stanford University Hospital Tranfusion Services Room P 1099 Stanford, California 94305 (415) 497-7346	HLA, RBC-A	$58.40 per person (RBC-A) $143.75 per person (HLA)
Robert T. McColmon, Jr. Immunological Associates 3570 East 12th Avenue Suite 200 Denver, Colorado 80206 (303) 321-6027	HLA	$100 per person
Herbert Silver, M.D. Immunohemotology Hartford Hospital 80 Seymour Street Hartford, Connecticut 06115 (203) 524-2845	HLA, RBC-A	$400 for 3 persons

	GROUPS	FEES
Norman C. Kramer, M.D. Metropolitan Washington Regional Histocompatibility Laboratory 2300 Eye Street N.W. Ross Hall Room 411 Washington, D.C. (202) 676-2767	HLA	$300 per person
Salley E. Ryden, M.D. University of Florida Box J275, JHMHC Department of Pathology Gainesville, Florida 32610 (904) 392-3581	HLA, RBC-A	$400 for 3 persons
American Medical Labs., Inc. 4173 Roosevelt Blvd. Jacksonville, Florida 32210 (904) 388-6610	HLA, RBC-A	$450 for 3 persons
Dr. William LeFor University of South Florida Medical Center Transplant Lab MDC Box 19 12901 North 30th Street Tampa, Florida 33612 (813) 974-4293	HLA	$500 for 3 persons
Jung H. Oh, M.D., Ph.D. Tissue Typing Laboratory Grady Memorial Hospital 80 Butler Street, S.E. Atlanta, Georgia 30303 (404) 588-4015	HLA, RBC-A	$350 for 3 persons
Young K. Park, M.D. St. Francis Hospital 2230 Liliha Street Honolulu, Hawaii	HLA	*Not available
Ruta M. Radvany Ph.D. Tissue Typing Department Of Surgery Northwestern University Medical School Searle 13-489 320 East Superior Street Chicago, Illinois 60611 (312) 649-8069	HLA	$600 for 3 persons

	GROUPS	FEES
P.R. McConnachie Renal Transplantation Laboratory Memorial Medical Center 800 N. Routledge Street Springfield, Illinois 62702 (217) 788-3904	HLA	$83 per person
Peter M. Rothman, M.D. Fort Wayne Red Cross Blood Services HLA Laboratory 1212 East California Road Fort Wayne, Indiana 46825 (219) 483-3158 Ext. 37	HLA	$100 per person
Angenieta Biegel, M.D. Allergy and Tissue Typing Indiana University Medical Center 1100 West Michigan Riley Surgery S-09 Indianapolis, Indiana 46223 (317) 264-2036	HLA	$385 for 3 persons
Irene Sniecimski, M.D. Tissue Typing Laboratory Department of Path. University of Kentucky Medical Center 800 Rose Street Lexington, Kentucky 40536 (606) 233-6329	HLA, RBC-A	$699 for 3 persons
Dr. R. S. Howell Jewish Hospital Blood Bank 217 E. Chestnut Street Louisville, Kentucky 40202 (502) 587-4011	HLA, RBC-A	$184 per person
Leslie Ray Bryant, Jr., M.D. Blood Bank Southern Baptist Hospital 2700 Napoleon Avenue New Orleans, Louisianna 70115 (504) 897-5945	HLA, RBC-A	$150 per person
David S. DeJongh, M.D. Tulane University Department of Medicine Tulane Avenue New Orleans, Louisiana 70002 (504) 588-5259	HLA, RBC-A	$100 per person

	GROUPS	FEES
Paula Romano, Ph.D. Edward Kloza Cellular Immunology Laboratory Foundation for Blood Research P.O. Box 426 Scarsborough, Maine 04074 (207) 883-4362	HLA, RBC-A Se. Pr.	Not available
Baltimore, Rh Typing Laboratory, Inc. 513 W. Lombard Street Baltimore, Maryland 21201 (301) 539-4384	HLA, RBC-A, (RBC-E, Se.Pr.- available June, 1980)	$175 for 3 persons (RBC-A) $225 for 3 persons (HLA) $350 for 3 persons (RBC-A + HLA)
John Lee, Ph.D. HLA Programs ARC National Headquarters 4915 Auburn Avenue Bethesda, Maryland 20014 (301) 652-4754	HLA	$300 for 3 persons
Center for Blood Research 800 Huntington Avenue Boston, Massachusetts 02115 (617) 731-6470	HLA, RBC-A, Se. Pr.	$360 for 3 persons (RBC-A, Se. Pr.) $660 for 3 persons (RBC-A, Se. Pr., HLA)
Angelyn A. Konugres, Ph.D. Boston Hospital for Women 221 Longwood Avenue Boston, Massachusetts 02115 (617) 732-4401	HLA, RBC-A, Se.Pr.	$150 for 3 persons (RBC-A) $250 for 3 persons (HLA) $100 for 3 persons (Se.Pr.)
Richard Haines, Ph.D. University of Michigan Medical Center 5667 Kresge Building Ann Arbor, Michigan 48109 (313) 764-0280	HLA, RBC-A	$85 per person
Robert Bull, M.D. Michigan State University Department of Medicine B228 Life Science East Lansing, Michigan (517) 355-4616	HLA, RBC-A	$125 per person
John Kately, Ph.D. Edward W. Sparrow Hospital 1215 E. Michigan Avenue Lansing, Michigan 48909 (517) 487-2552	HLA, RBC-A	$235 for 3 persons (RBC-A) $350 for 3 persons (HLA) $485 for 3 persons (RBC-A + HLA)

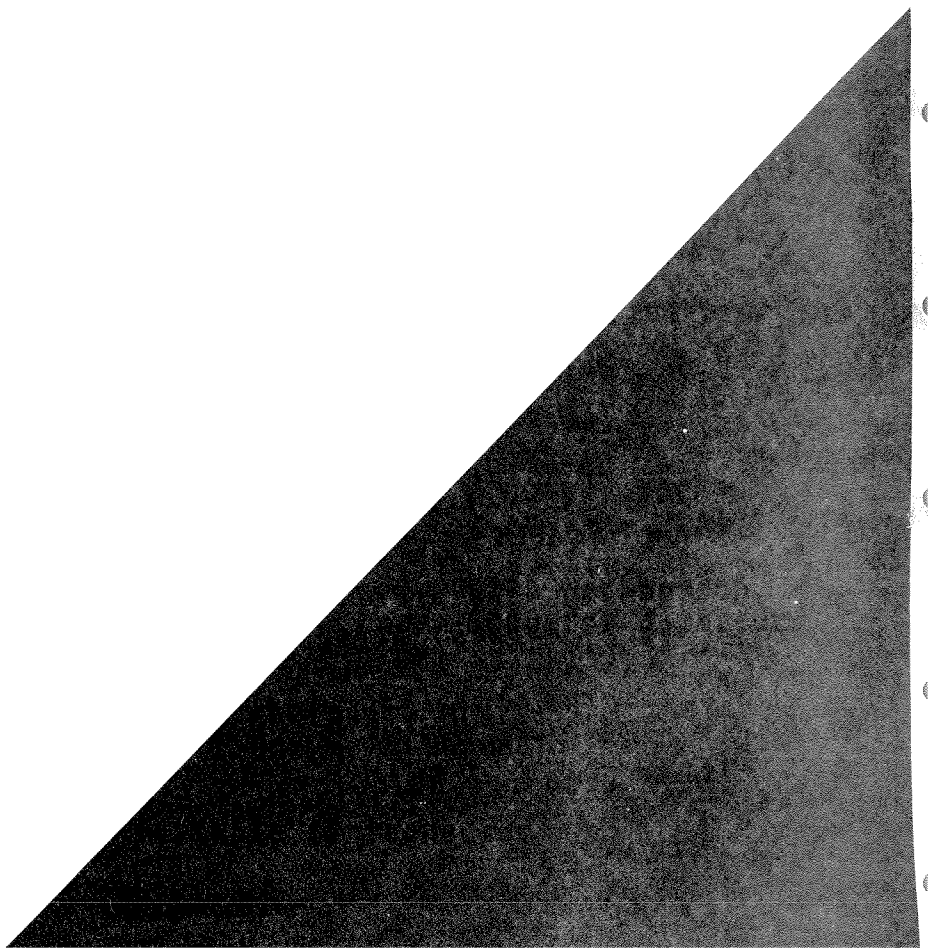
	GROUPS	FEES
R. H. Walker, M.D. William Beaumont Hospital Blood Bank Royal Oak, Michigan 48072 (313) 288-7080	HLA, RBC-A Se.Pr.	$475 for 3 persons
William V. Miller, M.D. Mo-Ill. Regional American Red Cross Blood Services 4050 Lindell Blvd. St. Louis, Missouri 63108 (314) 658-2114	HLA, RBC-A	$150 per person
Arthur L. Larsen, M.D. University Nebraska Medical Center 42nd and Dewey Omaha, Nebraska 68105 (402) 541-7832	HLA, RBC-A	$650 for 3 persons
Mary Hitchcock Memorial Hospital 2 Maynard Street Hanover, New Hampshire (603) 643-4000	HLA, RBC-A	$25 per person (RBC-A) $61 per person (HLA)
Dr. N. Ende College of Medicine & Dentistry of New Jersey 100 Bergen St. Newark, New Jersey 07103 (201) 456-4300	HLA	$400 for 3 persons
Gary M. Troup, M.D. Department of Pathology School of Medicine University of New Mexico Albuquerque, New Mexico 87131 (505) 277-3216	HLA, RBC-A	$50 per person (RBC-A) $150 per person (RBC-A + HLA)
Histocompatibility Lab Rochester, New York Red Cross 50 Prince Street Rochester, New York 14607 (716) 275-9800	HLA	$100 for 3 persons $135 for 4 persons or more
Allyn May, M.D. Department of Surgery University of Rochester 601 Elmwood Avenue Rochester, New York 14642 (716) 275-2744	HLA	$50 per person

	GROUPS	FEES
St. Mary's Hospital Blood Bank 89 Genesee Street Rochester, New York 14611 (716) 328-3300	HLA, RBC-A	$250 for 3 persons
Dr. Frederick R. Davey Upstate Medical Center Blood Bank 750 East Adams Street Syracuse, New York 13210 (315) 473-4460	HLA, RBC-A	$50 per person (RBC-A) $100 per person (HLA)
Emily G. Reisner, Ph.D. HLA Laboratory Duke Hospital Blood Bank Box 3934 Duke University Medical Center Durham, North Carolina 27710 (919) 684-3089	HLA, RBC-A	$50 per person (RBC-A) $95 per person (HLA)
Eugene Heise, M.D. Medical Immunology Bowman Gray School of Medicine Winston-Salem, North Carolina 27103 (919) 727-4456	HLA, RBC-A	$45 per person (RBC-A) $90 per person (HLA)
Dr. Paul Nathan The Paul I. Hoxworth Blood Center of The University of Cincinnati 3231 Burnet Ave. Cincinnati, Ohio 45267 (513) 872-5383	HLA, RBC-A	$50 per person (RBC-A) $100 per person (HLA)
William E. Braun, M.D. Department of Immunology Cleveland Clinic 9500 Euclid Avenue Cleveland, Ohio 44106 (216) 444-6582	HLA, RBC-A	$632.50 for 3 persons
Community Blood Center 349 South Main Street Dayton, Ohio 45402 (513) 461-5267	HLA, RBC-A	$500 for 3 persons
Tissue Typing Laboratory Room 257, Building 3 Medical College of Ohio Department of Pathology CS 10008 Toledo, Ohio 43699 (419) 381-4292	HLA	$112.50 per person

	GROUPS	FEES
Dr. T. W. Violett St. Anthony Hospital 1000 N. Lee P.O. Box 205 Oklahoma City, Oklahoma 73102 (405) 231-1811	HLA, RBC-A	$450 for 3 persons
Frans Peetoom, M.D., Ph.D. Tissue Typing Laboratory and Immunology Reference Services Pacific N.W. Red Cross Blood Services 4200 S.W. Corbett Portland, Oregon 97201 (503) 243-5242	HLA, RBC-A	$50 per person (RBC-A) $100 per person (HLA) $125 per person (RBC-A + HLA)
Chester M. Zmijewski, Ph.D. Histocompatibility Testing 3400 Spruce Street 6W Gates Bldg. Philadelphia, Pennsylvania 19104 (215) 662-3424	HLA	$630 for 3 persons
Miriam B. Dahlke, M.D. Penn Jersey Regional Red Cross 23rd and Chestnut Streets Philadelphia, Pennsylvania 19103 (215) 299-4130	HLA, RBC-A	$125 per person
Clinical Immunopathology 406 Scaife Hall University of Pittsburgh School of Medicine Pittsburgh, Pennsylvania 15261 (412) 647-3785	HLA, RBC-A	$500 for 3 persons
Gary D. Niblack, Ph.D. Diaclin Laboratory, Inc. 10th Circle North at Pearl Nashville, Tennessee 37203 (615) 254-6437	HLA, RBC-A	$150 for 3 persons (RBC-A) $500 for 3 persons (RBC-A + HLA)
Pathology Laboratory P.A. 1501 Arizona El Paso, Texas 79902 (915) 545-1400	HLA, RBC-A	$75 per person (RBC-A) $100 per person (RBC-A + HLA)
Ronald Kerman Histocompatibility and Immune Monitoring Labs University of Texas Medical School (MSMB 6254) Division of Organ Transplantation 6431 Fannin Houston, Texas 77030 (713) 792-5680	HLA	$275 per person $660 for 3 persons

	GROUPS	FEES
Dr. M. B. Stroud Medical Center Clinical Laboratory Suite 178 4499 Medical Drive San Antonio, Texas 78229 (512) 690-1010	HLA, RBC-A	$40 per person (RBC-A) $150 per person (HLA)
C.W. DeWitt, Ph.D. Tissue Typing Laboratory University of Utah Medical Center 50 North Medical Drive Salt Lake City, Utah 84132 (801) 581-7425	HLA	$90 per person
Bruce MacPherson, M.D. Medical Center Hospital of Vermont Burlington, Vermont 05401 (802) 656-3680	HLA, RBC-A	$55 per person (RBC-A) $80 per person (HLA)
K. A. Sullivan, Ph.D. Histocompatibility Testing West Virginia University Medical Center Morgantown, West Virginia (304) 293-2241	HLA, RBC-A	$575 for 3 persons
Gary A. Becker, M.D. Badger Red Cross 1202 Ann Street Madison, Wisconsin 53713 (608) 255-0021	HLA	$200 for 3 persons
University of Wisconsin Histocompatibility Laboratory 600 Highland Avenue Madison, Wisconsin 53792 (608) 263-8815	HLA, RBC-A	$40 per person (RBC-A) $90 per person (HLA)
Rene J. Duquesnoy, Ph.D. The Blood Center of Southeast Wisconsin P.O. Box 10G Milwaukee, Wisconsin 53201 (414) 933-5000	HLA, RBC-A Se. Pr.(Available in the future)	$170 per person

☆ U. S. GOVERNMENT PRINTING OFFICE : 1980 311-267/209



OCSE Publication 0004

UNIFORM ACT ON BLOOD TESTS TO DETERMINE PATERNITY

Be it enacted (use the proper enacting clause for the state).

SECTION 1. *Authority for Test.* In a civil action, in which paternity is a relevant fact, the court, upon its own initiative or upon suggestion made by or on behalf of any person whose blood is involved may, or upon motion of any party to the action made at a time so as not to delay the proceedings unduly, shall order the mother, child and alleged father to submit to blood tests. If any party refuses to submit to such tests, the court may resolve the question of paternity against such party or enforce its order if the rights of others and the interests of justice so require.

SECTION 2. *Selection of Experts.* The tests shall be made by experts qualified as examiners of blood types who shall be appointed by the Court. The experts shall be called by the court as witnesses to testify to their findings and shall be subject to cross-examination by the parties. Any party or person at whose suggestion the tests have been ordered may demand that other experts, qualified as examiners of blood types, perform independent tests under order of court, the results of which may be offered in evidence. The number and qualifications of such experts shall be determined by the court.

SECTION 3. *Compensation of Expert Witnesses.* The compensation of each expert witness appointed by the court shall be fixed at a reasonable amount. It shall be paid as the court shall order. The court may order that it be paid by the parties in such proportions and at such times as it shall prescribe, or that the proportion of any party be paid by [insert name of the proper public authority], and that,

after payment by the parties or [insert name of the public authority] or both, all or part or none of it be taxed as costs in the action. The fee of an expert witness called by a party but not appointed by the court shall be paid by the party calling him but shall not be taxed as costs in the action.

SECTION 4. *Effect of Test Results.* If the court finds that the conclusions of all the experts, as disclosed by the evidence based upon the tests, are that the alleged father is not the father of the child, the question of paternity shall be resolved accordingly. If the experts disagree in their findings or conclusions, the question shall be submitted upon all the evidence. If the experts conclude that the blood tests show the possibility of the alleged father's paternity, admission of this evidence is within the discretion of the court, depending upon the infrequency of the blood type.

SECTION 5. *Effect on Presumption of Legitimacy.* The presumption of legitimacy of a child born during wedlock is overcome if the court finds that the conclusions of all the experts, as disclosed by the evidence based upon the tests, show that the husband is not the father of the child.

SECTION 6. *Applicability to Criminal Actions.* This act shall apply to criminal cases subject to the following limitations and provisions: (a) An order for the tests shall be made only upon application of a party or on the court's initiative; (b) the compensation of the experts shall be paid by [insert name of proper public authority] under order of court; (c) the court may direct a verdict of acquittal upon the conclusions of all the experts under the provisions of Section 4, otherwise the case shall be submitted for determination upon all the evidence.

SECTION 7. *Uniformity of Interpretation.* This act shall be so interpreted and construed as to effectuate its general purpose to make uniform the law of those states which enact it.

SECTION 8. *Severability Clause.* If any part of this act is declared invalid the remaining portion shall continue in full force and effect and shall be construed as being the entire act.

SECTION 9. *Short Title.* This act may be cited as the Uniform Act on Blood Tests to Determine Paternity.

SECTION 10. *Repeal.* All acts or parts of acts which are inconsistent with the provisions of this act are hereby repealed

[SECTION 11. *Time of Taking Effect.* This act shall take effect .....]

the property, but nothing in this subdivision prohibits the consideration of actual or estimated taxes for the purpose of determining the reasonable net rental value attributable to the property or property interest being valued.

(d) An opinion as to the value of any property or property interest other than that being valued.

(e) The influence upon the value of the property or property interest being valued of any noncompensable items of value, damage, or injury.

(f) The capitalized value of the income or rental from any property or property interest other than that being valued. [1965 ch 1151 § 4; 1978 ch 294 § 9.] *Cal Jur 3d Eminent Domain §§ 105, 199, 207, 210, 213, 214, 216, Evidence §§ 191, 560; Cal Practice §§ 386:78, 386:84; Witkin Evidence pp 403, 404, 405.*

ARTICLE 3

Opinion Testimony on Particular Subjects

§ 870. Opinion as to sanity. A witness may state his opinion as to the sanity of a person when:

(a) The witness is an intimate acquaintance of the person whose sanity is in question;

(b) The witness was a subscribing witness to a writing, the validity of which is in dispute, signed by the person whose sanity is in question and the opinion relates to the sanity of such person at the time the writing was signed; or

(c) The witness is qualified under Section 800 or 801 to testify in the form of an opinion. [1965 ch 299 § 2.] *Cal Jur 3d Criminal Law § 1862, Evidence §§ 543, 544, 546, 548; Cal Practice § 100:16; Witkin Evidence pp 353, 354, 1012; Summary (8th ed) p 5615.*

CHAPTER 2

Blood Tests to Determine Paternity

§ 890. Short title. This chapter may be cited as the Uniform Act on Blood Tests to Determine Paternity. [1965 ch 299 § 2.] *32 Cal Jur 3d Family Law §§ 162, 163; Cal Practice § 153:22; Witkin Evidence pp 4, 618, 619.*

§ 891. Interpretation. This act shall be so interpreted and construed as to effectuate its general purpose to make uniform the law of those states which enact it. [1965 ch 299 § 2.] *32 Cal Jur 3d Family Law §§ 162, 163; Cal Practice § 153:22; Witkin Evidence p 619.*

§ 892. Order for blood tests in civil actions involving paternity. In a civil action in which paternity is a relevant fact, the court may upon its own initiative or upon suggestion made by or on behalf of any person whose blood is involved, and shall upon motion of any party to the action made at a time so as not to delay the proceedings unduly, order the mother, child, and alleged father to submit to blood tests. If any party refuses to submit to such tests, the court may resolve the question of paternity against such party or enforce its order if the rights of others and the interests of justice so require. [1965 ch 299 § 2.] *32 Cal Jur 3d Family Law §§ 162, 163; Cal Practice § 153:22; Witkin Evidence pp 619, 620, 621, 622.*

§ 893. Tests made by experts. The tests shall be made by experts qualified as examiners of blood types who shall be appointed

by the court. The experts shall be called by the court as witnesses to testify to their findings and shall be subject to cross-examination by the parties. Any party or person at whose suggestion the tests have been ordered may demand that other experts, qualified as examiners of blood types, perform independent tests under order of court, the results of which may be offered in evidence. The number and qualifications of such experts shall be determined by the court. [1965 ch 299 § 2.] *32 Cal Jur 3d Family Law §§ 162, 163; Cal Practice § 153:22; Witkin Evidence pp 621, 1023.*

§ 894. Compensation of experts. The compensation of each expert witness appointed by the court shall be fixed at a reasonable amount. It shall be paid as the court shall order. The court may order that it be paid by the parties in such proportions and at such times as it shall prescribe, or that the proportion of any party be paid by the county, and that, after payment by the parties or the county or both, all or part or none of it be taxed as costs in the action. [1965 ch 299 § 2.] *32 Cal Jur 3d Family Law §§ 162, 163; Cal Practice § 153:22; Witkin Evidence p 621.*

§ 895. Determination of paternity. If the court finds that the conclusions of all the experts, as disclosed by the evidence based upon the tests, are that the alleged father is not the father of the child, the question of paternity shall be resolved accordingly. If the experts disagree in their findings or conclusions, the question shall be submitted upon all the evidence. [1965 ch 299 § 2.] *32 Cal Jur 3d Family Law §§ 162, 163; Cal Practice § 153:22; Witkin Evidence pp 620, 621; Summary (8th ed) p 4738.*

§ 896. Limitation on application in criminal matters. This chapter applies to criminal actions subject to the following limitations and provisions:

(a) An order for the tests shall be made only upon application of a party or on the court's initiative.

(b) The compensation of the experts shall be paid by the county under order of court.

(c) The court may direct a verdict of acquittal upon the conclusions of all the experts under the provisions of Section 895; otherwise, the case shall be submitted for determination upon all the evidence. [1965 ch 299 § 2.] *32 Cal Jur 3d Family Law §§ 162, 163; Cal Practice § 153:22; Witkin Evidence pp 619, 622.*

§ 897. Right to produce other expert evidence. Nothing contained in this chapter shall be deemed or construed to prevent any party to any action from producing other expert evidence on the matter covered by this chapter; but, where other expert witnesses are called by a party to the action, their fees shall be paid by the party calling them and only ordinary witness fees shall be taxed as costs in the action. [1965 ch 299 § 2.] *32 Cal Jur 3d Family Law §§ 162, 163; Cal Practice § 153:22; Witkin Evidence p 621.*

EXHIBIT G

CALIFORNIA LEGISLATURE—1979-80 REGULAR SESSION

ASSEMBLY BILL No. 1981

Introduced by Assemblyman Stirling

January 7, 1980

REFERRED TO COMMITTEE ON JUDICIARY

An act to amend Section 895 of the Evidence Code, relating to blood tests.

LEGISLATIVE COUNSEL'S DIGEST

AB 1981, as introduced, Stirling (Jud.). Paternity: blood tests.

Under current case law, although the rule is that standard red blood cell (HBO) tests are admissible only to exculpate, and not to implicate a defendant in a paternity proceeding, it has been recently held that human leucocyte antigen (HLA) tests (tissue typing of white blood cells) are admissible evidence of paternity. The language of the Uniform Act on Blood Tests to Determine Paternity provides that if the court finds that the conclusions of all of the experts are that the alleged father is not the father of the child, the question of paternity shall be resolved accordingly. If, on the other hand, the experts disagree in their findings or conclusions, the question is required to be submitted upon all the evidence.

This bill would provide that if the experts disagree in their findings or conclusions or if the tests show the possibility of the alleged father's paternity, the question may be submitted upon all the evidence, including the evidence of probability based upon the facts, subject to exclusion on designated grounds.

Vote: majority. Appropriation: no. Fiscal committee: no.

State-mandated local program: no.

The people of the State of California do enact as follows:

SECTION 1. Section 895 of the Evidence Code is amended to read:

895. If the court finds that the conclusions of all the experts, as disclosed by the evidence based upon the tests, are that the alleged father is not the father of the child, the question of paternity shall be resolved accordingly. If the experts disagree in their findings or conclusions, *or if the tests show the possibility of the alleged father's paternity,* the question ~~shall~~ *may, subject to Section 352,* be submitted upon all the evidence, *including the evidence of probability based upon the tests.*

O

ASSEMBLY COMMITTEE ON JUDICIARY
JACK R. FENTON, CHAIRMAN

Prepared by
L. Young

BILL DIGEST

BILL: AB 1981 HEARING DATE: 3/12/80

AUTHOR: Stirling

SUBJECT: Paternity: Blood Tests

OBJECTIVE:

The intent of this bill is to permit the proof of paternity through the use of evidence based upon blood tests.

BILL DESCRIPTION:

Existing law provides that in any action where the issue of paternity must be resolved, the court may order the mother, child, and alleged father to submit to blood tests. If all the expert witnesses in the case conclude, on the basis of the evidence, that the alleged father is not the father of the child, the court must resolve the issue accordingly. If the expert witnesses disagree, the question of paternity is submitted upon all the evidence.

This bill would retain the existing test of non-paternity. However, it would also provide that if the experts disagree in their findings or conclusions or if the tests show the possibility of the alleged father's paternity, the question may be submitted upon all the evidence, including the evidence of probability based upon the tests. Blood test evidence to prove paternity would be subject to Evidence Code Section 352, which provides that a court has discretion to exclude evidence if its probative value is substantially outweighed by its prejudicial nature.

SOURCE:

Author

(CONTINUED)

SUPPORT:

Conference of Delegates of the State Bar of California

OPPOSITION:

Western Center on Law and Poverty
American Civil Liberties Union

COMMENT:

1. The current legislative policy in California regarding the use of blood tests to resolve the question of paternity is that only non-paternity may be conclusively established. The rationale behind this policy stems from the fact that at the time existing law was adopted, the Landsteiner classification of blood groups, i.e., red blood cell (ABO) test, was generally acceptable in the scientific community. However, this method can determine only whether a man is not the father of the child. It cannot show that a man is conclusively the father of the child. If the negative fact cannot be shown, it simply means that the alleged father is in a blood group classification which makes it possible for him to be the father, but any other person within the same blood classification or other classifications might also be the father. For this reason, existing law precludes the admissibility of evidence from red blood cell tests alone to show paternity on the grounds that such evidence is dangerously prejudicial.

2. Section 4 of the Uniform Act on Blood Tests to Determine Paternity, in pertinent part, states:

> If the experts conclude that the blood tests show the possibility of the alleged father's paternity, admission of this evidence is within the discretion of the court, depending upon the infrequency of the blood type.

This language was deleted from the California version of the Uniform Act when it was adopted in 1953.

AB 1981 would provide that evidence of probability of the alleged father's paternity based upon blood tests may, upon the discretion of the court, be admissible to prove paternity.

3. It is argued that the Human Leukocyte Antigen (HLA) test, a newer sceintific method for determining paternity, surpasses in accuracy the Landsteiner classification of blood groups and subsequent improvements

(CONTINUED)

on that type of test. The Landsteiner method and its subsequent improvements are considered to have only a 50%-60% probability of determining parentage since they involve only the small number of variables of red blood cell grouping. In contrast, the HLA test is based on tissue typing of white blood cells and involves a much larger number of factors, antigens in white blood cells. Antigens stimulate the production of antibodies to fight off the introduction of foreign substances, such as a transplanted kidney. The antigens are controlled by a group of genes whose specific makeup varies from person to person. Hence, antigens may be regarded as genetic markers on the white blood cells. The HLA test is considered to have a greater than 90% probability of determining parentage. For example, if there is a 98.3% probability that a defendant is the father, then only 1.7% of the population could be the father and the defendant is in this group. Compared to the red blood cell tests, the HLA test requires special reagents and is therefore very expensive to administer.

This bill would permit the admissibility of evidence based on HLA test results to prove paternity.

4. Presumably this bill will enable paternity to be proved more easily. As a result, it is argued, more fathers will be held responsible for the financial support of their children, and taxpayer dollars now alloted to support payments will be reduced.

5. In Cramer v. Morrison, 88 Cal. App. 3d 873 (1979), the Fourth District Court of Appeal acknowledged that existing law regarding the use of blood tests to prove paternity could arguably be interpreted to prohibit the use of the Landsteiner-type blood test results. The court, however, held that existing statutory law does not preclude the admissibility of HLA test results to prove paternity.

Further, in County of Fresno v. Superior Court, 92 Cal. App. 3d 133 (1979), the court held that there is no judicial discretion to deny an HLA test upon demand of any party at whose suggestion an original extended factor blood test has been ordered.

Given the expense of the HLA test, the most practical procedure to follow in using blood tests to prove paternity would be to administer the simpler and less costly red blood cell tests (ABO, Rh, and MNSs) as a preliminary measure. If the defendant could not be

(CONTINUED)

excluded as the father, then the Kell, Duffy, and Kidd systems of blood tests would be used. Only after these types of tests have reflected the defendant's non-exclusion, would the HLA test likely be used. Should this bill specify that blood test evidence regarding the probability of paternity must be based on results of the HLA test?

6. Opponents of this bill argue that since all blood test evidence gives only the percentage possibility of paternity, such evidence may be given undue weight among all the other evidence submitted in a paternity action.

7. Last year, the Committee heard testimony on a similar bill, AB 1727 (Egeland). AB 1727 died in Committee.

EXHIBIT H

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
OFFICE OF CHILD SUPPORT ENFORCEMENT
ROCKVILLE, MARYLAND 20852

OCT 6 1980

The Honorable Jack Fenton
Chairman
Assembly Judiciary Committee
Capitol Building
Sacramento, California 95814

Attention: Ms. Letty Young

Subject: Blood Test Legislation

Dear Mr. Fenton:

I am an Assistant Iowa Attorney General on temporary assignment to the Office of Child Support Enforcement (OCSE) under provision of the Intergovernmental Personnel Act. In my home state I prosecuted paternity claims for four years, the last two as lead prosecutor for the Child Support Recovery Unit. One of my duties included researching and drafting legislation. In February, 1980 I returned to Iowa to testify on blood testing before a joint session of the Judiciary and Human Resources Committees of the House of Representatives. The enclosed legislation was subsequently passed by nearly unanimous vote of the House, similarly approved by the Senate, and will take effect on January 1, 1981.

House File 2516 essentially codified the law as practiced in many lower courts throughout Iowa and across the country. It made clear the right of either party to request blood tests in a civil action to determine paternity; and, it removed any doubt as to the evidentiary value of such tests which do not exclude the possibility of paternity.

The medical science of genetic identification has surpassed the state of the art of the law by a great distance. Test results which positively excluded the accused father were considered inconclusive many years after their acceptance in the medical community. See Berry vs. Chaplin, 74 Cal. App. 2d 652, 169 P.2d 442 (1946). Extended factor analyses of many different genetic systems to show cumulative evidence of the likelihood of biological relationship has been in wide use in Western Europe for twenty years, but this same "inclusionary" evidence has only recently earned the approval of a significant number of State Appellate Courts and Legislatures.

There are half a million children born out-of-wedlock each year. In the past, legal action to determine the paternity of any of these individuals amounted to little more than a swearing contest. There was no empirical evidence to rely upon and credibility of the parties was all important.

Wrongly accused fathers are now routinely given the benefit of multi-faceted testing of the various elements of the blood, which enables the vast majority of them to prove non-paternity and avoid the expense and uncertainty of a trial. Many laboratories employ sufficient testing procedures to exclude upwards of 95 percent of those putative fathers wrongly accused. If a man is not excluded, the evidence of genetic resemblance to the child is a strong, albeit circumstantial, indication of the likelihood of paternity. This evidence must be taken in the context of other testimony showing intercourse during the period when conception could have occurred, and lack of access by other men with similar compatible blood types, but it automatically lends an aura of plausibility to an otherwise non-verifiable claim.

There are dozens of serologic tests in common use today for paternity testing. See "Joint AMA-ABA Guidelines: Present Status of Serologic Testing in Problems of Disputed Parentage," Family Law Quarterly, Vol. X, No. 3, Fall, 1976. Some of these tests of the red cell antigens (RCA), e.g.s ABO, Rh-Hr, MNS, were developed in the early part of the twentieth century. One test of the human leukocyte (white cell) antigens (HLA) identifies genetic characteristics with such specificity that two-thirds of the male population can be eliminated as possible fathers of a given child without any additional testing. Other tests which utilize the enzymes and proteins found in the red blood cells can yield substantially the same results. When HLA testing is performed in conjunction with the traditional red cell antigen tests (ABO, Rh, etc.), or RCA tests are performed along with serum protein and enzyme tests, the cumulative probability of excluding a wrongly accused father may easily exceed 95 percent. If a number of relatively rare components of the child's blood, which are not present in the mother, are discovered in the putative father's blood, then the "likelihood" or "probability" that he may be the true father of the child can be calculated using standard gene frequency tables for the regional population.

A number of States have enacted laws in their recent legislative sessions which provide that extended factor genetic testing which includes the possibility of paternity is admissible as evidence. Georgia, Indiana, Iowa, Minnesota, North Carolina, Oregon, and Wisconsin have all adopted such laws in one form or another.

Significant points to consider in drafting new blood test legislation include the following:

1. Provide that either party,or the court may move for genetic testing; and, provide authority for compelling the parties to submit to physical examination;

2. Do not limit the law to one variety of tests (e.g. HLA only);

3. Specify that "statistical probability of paternity" may be shown and such reports are admissible in evidence;

4. Provide that if there is any dispute concerning any aspect of the testing procedure, the results of the tests, or their interpretation, then additional testing may be performed at the expense of the requesting party;

5. Provide that chain of custody may be established by affidavit;

6. Provide that the expert's verified report may be admitted at trial, unless adequate notice is given (20-30 days) before the hearing that the evidence is challenged, and specifying the reasons therefore;

7. Provide that costs be paid by the parties.

Many of the points noted above are incorporated in the Iowa law.

The time is rapidly approaching when genetic testing will be routinely administered in the majority of seriously contested paternity disputes. Paternity trials could, then, for the most part, be eliminated.

The United States Supreme Court has concluded that the Constitution provides that illegitimate children are entitled to substantive equality with their legitimate contemporaries. Such status means nothing, however, until paternity is legally ascertained. The crisis of illegitimacy is such that it is impossible for the courts to handle all of the cases separately by judicial review. The vast majority of those disputes can be settled by readily available analyses of inherited characteristics. If the putative father cannot be excluded as a possible biological ancester and, furthermore, if there are significant indications of likely relationship, this empirical evidence should be made available to the court. It stands in the face of reason to bar what may be the only truly objective information which may be reviewed by the trier of fact.

The Office of Child Support Enforcement is deeply concerned that all children should have legal relationships with their fathers and should receive support from both their parents according to their means. The enhancement of paternity determination programs across the country is a major initiative of this office.

Sincerely yours,

Robert E. Keith
Policy Branch
Policy and Planning Division

Enclosure

cc: Louis B. Hays
Robert A. Barton

HOUSE FILE 2516

AN ACT

RELATING TO THE DETERMINATION OF THE PARENT AND CHILD RELATIONSHIP AND THE OBLIGATIONS OF PARENTS TO THEIR CHILDREN.

BE IT ENACTED BY THE GENERAL ASSEMBLY OF THE STATE OF IOWA:

Section 1. Chapter six hundred seventy-five (675), Code 1979, is amended by adding sections two (2) and three (3) of this Act.

Sec. 2. NEW SECTION. CUSTODY AND VISITATION. The mother of a child born out of wedlock whose paternity has not been acknowledged and who has not been adopted has sole custody of the child unless the court orders otherwise. If a judgment of paternity is entered, the father may petition for rights of visitation or custody in an equity proceeding separate from any action to establish paternity.

Sec. 3. NEW SECTION. BLOOD TESTS. In any proceeding to establish paternity in law or in equity the court may on its own motion, and upon request of a party shall, require the child, mother, and alleged father to submit to blood tests. If a blood test is required, the court shall direct that inherited characteristics, including but not limited to blood types, be determined by appropriate testing procedures, and shall appoint an expert qualified as an examiner of genetic markers to analyze and interpret the results and to report to the court. Blood test results which show a statistical probability of paternity are admissible and shall be weighed along with other evidence of the alleged father's paternity. If the results of blood tests or the expert's analysis of inherited characteristics is disputed, the court, upon reasonable request of a party, shall order that an additional test be made by the same laboratory or an independent laboratory at the expense of the party requesting additional testing. Verified documentation of

the chain of custody of the blood specimens is competent evidence to establish the chain of custody. A verified expert's report shall be admitted at trial unless a challenge to the testing procedures or the results of blood analysis has been made before trial. All costs shall be paid by the parties in proportions and at times determined by the court.

Sec. 4. This Act takes effect January first following its enactment.

WILLIAM H. HARBOR
Speaker of the House

TERRY E. BRANSTAD
President of the Senate

I hereby certify that this bill originated in the House and is known as House File 2516, Sixty-eighth General Assembly.

BRUCE GRAHAM
Assistant Chief Clerk of the House

Approved _____, 1980

ROBERT D. RAY
Governor